Universidade de Évora - Instituto de Investigação e Formação Avançada

Universidade da Beira Interior - Faculdade de Ciências Sociais e Humanas

Programa de Doutoramento em Economia

Tese de Doutoramento

The Impact of the ASEAN Economic Community (AEC) on Oil Palm Producers in Thailand

Kanchalika Kongyong

Orientador(es) | Manuel Couret Pereira Branco

Pedro Damião de Sousa Henriques

Évora 2020

Universidade de Évora - Instituto de Investigação e Formação Avançada

Universidade da Beira Interior - Faculdade de Ciências Sociais e Humanas

Programa de Doutoramento em Economia

Tese de Doutoramento

The Impact of the ASEAN Economic Community (AEC) on Oil Palm Producers in Thailand

Kanchalika Kongyong

Orientador(es) | Manuel Couret Pereira Branco

Pedro Damião de Sousa Henriques

Évora 2020

A tese de doutoramento foi objeto de apreciação e discussão pública pelo seguinte júri nomeado pelo Diretor do Instituto de Investigação e Formação Avançada:

Presidente	Carlos Manuel Rodrigues Vieira (Universidade de Évora)
Vogais	Isabel Maria Gomes Rodrigo (Universidade Técnica de Lisboa - Instituto Superior de Agronomia) Luís Mah (Instituto Superior de Economia e Gestão (ISEG)) Maria Leonor da Silva Carvalho (Universidade de Évora) Maria de Fátima Martins Lorena de Oliveira (Instituto Politécnico de Coimbra - Escola Superior Agrária de Coimbra) Pedro Damião de Sousa Henriques (Universidade de Évora) (Orientador)

Évora 2020

Dedicated to my beloved family

Dedicado à minha amada família

ACKNOWLEDGMENT

First of all, I am very grateful to the EMMA-EAST 2014: ERASMUS MUNDUS Scholarship and University of Evora, Portugal, and all of the staff that gave this most prominent opportunity to archive the study goal in Ph.D. to me.

I would like to express my most profound appreciation to both supervisors, Professor Manuel Couret Pereira Branco and Professor Pedro Damião De Sousa Henriques, whose work demonstrated to me, always help, lead my spirit, and give me many chances to finish and successful in this study. Without their guidance and persistent help, this thesis would not have been possible.

I am indebted to many colleagues who supported me, whether in a small city like Evora or Thailand. They never left me alone and always cheered me up with persuasive words.

I owe my deepest gratitude to Mr. Philippe Regenass, who always beside and has always given me the strength to fight. Thank you very much for all the support that I will never get from anybody.

Most of all, this thesis is dedicated to my beloved family, who have given the opportunity of education from the best institutions and support throughout my life.

-- Without these people, the thesis and Ph.D. study would not be possible and successful --

Kanchalika Kongyong

February 2020

ABSTRACT

All ASEAN member states intend to establish the ASEAN Economic Community (AEC) by 2015, in order to make ASEAN a single market and production-based with the alleged purpose of making ASEAN a more dynamic and competitive region. This study aims at identifying the impacts of this single market and the production base policy of the AEC on oil palm producers in Thailand.

In order to study the impacts of the AEC on oil palm producers in Thailand, we shall resort to qualitative and quantitative research methods. These methods have applied in three provinces in Southern Thailand: Surat Thani, Krabi, and Chumphon. More specifically, the negative and positive impacts of the single market and production-based policy of the AEC on oil palm producers will concern economic and social aspects, the production system, the environment, and food security.

Primary data were collected using 400 semi-structured questionnaires, were using purposive and snowball selection. The analytical tool was the Analytic Hierarchy Process (AHP) containing goals, criteria, and specified impacts of the AEC on oil palm producers in Thailand. The result reveals that the economic impacts, such as an increase in investment opportunities in oil palm and employment, are the most critical positive impacts, while social impacts are the most significant negative impacts, especially prejudice in solving by the government.

The preparation for entering the AEC for oil palm in Thailand should focus on increasing production and extracted oil efficiency so that that palm oil can compete with other countries. In addition, there should be cooperation with the main producing countries in ASEAN regarding the quality of standardized palm oil and palm oil-based products (ASEAN Sustainable Palm Oil: ASPO) as well as pushing the production of oil palm and palm oil in accordance with the ASPO quality standards or RSPO standards to increase trade channels outside the region.

KEYWORDS: ASEAN Economic Community, AEC, Oil palm, Impact, Thailand

RESUMO

Todos os estados membros da ASEAN pretendem estabelecer a Comunidade Económica da ASEAN até 2015, a fim de tornar a ASEAN um mercado único e baseado na produção, com o objetivo de tornar a ASEAN uma região mais dinâmica e competitiva. Este estudo tem como objetivo identificar os impactos desse mercado único e a política de base de produção da Comunidade Económica da ASEAN (AEC) sobre os produtores de dendezeiros na Tailândia.

Para estudar os impactos da Comunidade Económica da ASEAN (AEC) nos produtores de dendezeiros da Tailândia, recorreremos a métodos de pesquisa qualitativa e quantitativa. Esses métodos foram aplicados em três províncias do sul da Tailândia: Surat Thani, Krabi, e Chumphon. Mais especificamente, os impactos negativos e positivos do mercado único e da política de produção da Comunidade Económica da ASEAN (AEC) sobre os produtores de dendezeiros envolverão aspectos económicos e sociais, sistema de produção, meio ambiente e segurança alimentar.

Os dados primários foram recolhidos usando 400 questionários semiestruturados, usando seleção proposital e de bola de neve. A ferramenta analítica foi o Processo de hierarquia analítica (AHP), contendo objetivos, critérios e impactos especificados da Comunidade Económica da ASEAN (AEC) nos produtores de dendezeiros na Tailândia. O resultado revela que os impactos económicos, como o aumento das oportunidades de investimento no dendezeiro e no emprego, são os impactos positivos mais críticos. Embora os impactos sociais sejam os impactos negativos mais significativos, especialmente os preconceitos na solução por parte do governo.

A preparação para entrar na Comunidade Econômica da ASEAN (AEC) para o óleo de palma na Tailândia deve concentrar-se no aumento da produção e na eficiência do óleo extraído, para que o óleo de palma possa competir com outros países. Além disso, deve haver cooperação com os principais países produtores da ASEAN no que diz respeito à qualidade de produtos padronizados de óleo de palma e óleo de palma (ASEAN Sustainable Palm Oil: ASPO), além de impulsionar a produção de óleo de palma e óleo de palma de acordo com a os padrões de qualidade ASPO ou RSPO para aumentar os canais de comércio fora da região.

PALAVRAS-CHAVE: Comunidade Econômica da ASEAN, AEC, Dendê, Impacto, Tailândia

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DEFINITION OF TERMS

ASEAN	Association of Southeast Asian Nations: a geopolitical and economic organization in Southeast Asia. There are 10 member countries, including Cambodia, Thailand, Brunei, Myanmar, Philippines, Malaysia, Laos, Vietnam, Singapore and Indonesia.
ASEAN Economic Community (AEC)	Economic cohesion of ASEAN countries for the benefit of economic bargaining power, exports, and imports of goods and services.
Oil Palm	The tropical tree in the palm family (Arecaceae), cultivated as a source of oil.
Palm Oil	The vegetable oil which derived from the mesocarp of the fruit of the oil palms.
Palm Fatty Acid Distillate (PFAD)	The processing residue from the refining of edible palm oil, made from refining crude palm oil.
FFB	Fresh fruit bunches of oil palm
THB or Thai Baht	The currency in Thailand. One Thai Baht is around 0.027 Euros
Rai	A unit of area used in Thailand, equal to 1,600 square meters (0.16 hectares or 0.3954 acres)
Smallholder	A small-scale farmer, pastoralist, forest keeper, a fisher who manage areas varying from less than one hectare to 10 hectares (Less than 62.5 Rai)
Large holder	A large-scale farmer, pastoralist, forest keeper, a fisher who manage areas more than 10 hectares (more than 62.5 Rai)

CHAPTER 1

INTRODUCTION

1.1 Statement of the Problems

In modern times, the issue of competition in the global society has changed from the old era, from the competition of colonial powers to find new resources and markets to meet the needs of those superpower countries, nowadays, countries have turned to compete to expand economic power instead of expanding military power. The number of members of the World Trade Organization (WTO) and the observer countries of more than 180 countries around the world show that countries have played a role in international trade competition. However, countries with small economic size have faced obstacles in competing with countries with high economic growth, such as the United States, India, and China. Countries in ASEAN are well aware of such thoese disadvantages, therefore established an economic integration in ASEAN to strengthen economic in the region and increase economic competitiveness in the global arena. The economic integration not only makes ASEAN able to compete or increase the bargaining power of the economy on the world stage only but also make the economy within the region better, which will affect people, resulting in better living conditions as well.

Regional integration has been a growing tendency since 1945 (World War II), especially for economic purposes toward greater regional integration at the supra-national level. Particularly in the economic sphere, trends toward regional integration (e.g., EU and NAFTA) have often surpassed the more celebrated processes of globalization (Cumbers, 2009), and the most remarkable is EU integration (Plummer, 2006). The ASEAN Economic Community (AEC) is the largest integration effort attempted in the developing world (Petri, P.A. et al., 2010) and will move a step forward in integration 2015. A single market and production base should be created then with free movement of goods, services, foreign direct investment, and skilled labor. Its stated purpose is achieving a highly competitive economic region, a region of equitable economic development, and a region that fully integrated into the global economy (Association of Southeast Asia Nation, 2008).

In the midst of a highly competitive economic, trade, and international context, many countries have to adjust themselves in order to benefit from the global economy, including the integration of trade between countries such as the European Union and the North American Free Trade Area. The leaders of ASEAN member countries agreed in 2002 to establish the "ASEAN Economic Community" within 2015 to encourage ASEAN to be a single market and production base. There are free movement of funds, goods, services, investment,

and skilled labor between member countries. Also to promote the competitiveness of ASEAN, reducing the gap of development level of ASEAN member states and encourage ASEAN to be able to integrate with the global community without being in a disadvantaged situation.

The process of establishing the AEC which is one of the main pillars of making ASEAN achieve "ASEAN Community" by 2015, based on the cooperation and economic agreement that ASEAN has implemented for a while to build on the concrete results and the more pattern such as the agreement on the establishment of the ASEAN Free Trade Area, ASEAN Investment Promotion Agreement, ASEAN Tourism Agreement, and the agreement on ASEAN Industrial Cooperation. The 10 ASEAN countries are Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam.

1. Single Market and Production-Based: An ASEAN single market and production-based shall comprise five core elements, which are the free flow of goods, services, capital, investment, and skilled labor. Besides, the single market and production base also include two essential components that are priority integration sectors and food, agriculture, and forestry sector.

2. Competitive Economic Region: Including (1) competition policy, (2) consumer protection, (3) intellectual property rights, (4) infrastructure development, (5) taxation, and (6) e-commerce.

3. Equitable Economic Development: Including (1) SME development and (2) initiative for ASEAN integration.

4. Integration into the Global Economy: The objective is to enable ASEAN businesses to compete internationally, to make ASEAN more dynamic and stronger segment of the global supply chain, and to ensure that the internal market remains attractive for foreign investment by coherent approach towards external economic relations and enhanced participation in global supply networks.

Competition policy will play an essential role in the achievement of the “ASEAN Economic Community.” It has been significant progress in regional cooperation in order to achieve the competition policy targets listed in the AEC Blueprint. Free and fair trade has been considered key in Thailand (Lee and Fukunaga 2014). The Center for International Trade Studies (2011) conducted a study entitled "After One Year of the ASEAN Economic Community, what is Thailand’s Status in the ASEAN Market?” that found out that Thailand, Vietnam, and Indonesia

that will benefit from further integration by increasing their market share. What is the reality for oil palm in this regard?

Oil Palm has become the world's leading vegetable oil in terms of consumption and production, with 58 million tons produced worldwide in 2013. The biggest producer with 53.38 percent share in production in 2013 was Indonesia, followed by Malaysia 32.71 percent, and Thailand 3.62 percent (Index Mundi, 2013). Palm oil is used in many products, such as food, commodities (raw material or primary agricultural product), and as an alternative fuel source (Phitthayaphinant, P. et al., 2012). Especially due to the rising demand for biodiesel, oil palm production in Thailand has been steadily increasing over the last twenty years and will continue to grow in the future (Dallinger, 2011). Despite the expected benefits Thailand will get from further integration of ASEAN countries, some sectors may incur losses. Since the AEC is only established in 2015, there are only a few of the relevant literature about the impact of the AEC. This study will be the very first talking about the situation of oil palm after the establishment of AEC.

1.2 The Problems of Study

The study on the impact of the ASEAN Economic Community (AEC) on oil palm producers in Thailand to answer the question that:

(1) How the AEC plays a role in the world?

(2) What is the position of Thailand in order to compete with other member countries in the AEC?

(3) What are the significant impacts of the AEC on oil palm producers in Thailand?

(4) How can Thailand improve the competitiveness of oil palm producers with other member countries in the AEC?

1.3 Objectives

1.3.1 General Objectives

To analyse the farmers' perceptions of the impact of the ASEAN Economic Community (AEC) on oil palm sector in Thailand.

1.3.2 Specific Objectives

(1) To characterize an oil palm sector in Thailand, ASEAN, and the world.

(2) To characterize a sample of oil palm producers in Thailand.

(3) To know the farmers' perception of the impact from entering the AEC.

(4) To find suitable ways to improve the competitiveness of oil palm producers in Thailand after entering the AEC.

1.4 Significance of the Research

This research aims to identify the key challenges to long-term sustainability and highlight possible pathways to overcome them under the ASEAN Economic Community (AEC). To study the impact of the AEC on oil palm producers in Thailand, we must know the general characterization of the AEC, how it is working and what the goal of this regional integration is. Furthermore, we must know the structure of the farming system and oil palm producer in Thailand.

After clearly understanding the characterization of the AEC, farming system, and oil palm producer in Thailand, the next step is to identify the impact of the AEC on oil palm producers in Thailand. This study will be focused on the single market and production base policy, concerning the production, economic, social, environmental, and food security impacts. The results from this study will be beneficial to oil palm producers to use as a guideline, as well as providing information to the government and related institutions to be able to help and improve the oil palm producers in the right direction.

1.5 Hypotheses and Expected Results

This study has 2 sets of hypotheses, the first set of hypotheses regarding oil palm production in Thailand and a second set is about analyzing the perception that farmers have about the impact of the ASEAN Economic Community (AEC) on Oil Palm producers in Thailand.

The hypothesis of this study is gender, age, level of education, and the farm size affect the oil palm plantations of farmers in Thailand, and the expected result is Thailand will not have an advantage in oil palm production from entering the AEC.

Entering the AEC will lead Thailand to many changes that have both positive and negative sides. From the main 5 dimensions (1) production system (2) economic system (3) social system (4) environmental, and (5) food security that would impact to oil palm producers in Thailand after the AEC established. This study has the hypothesis on the impact of the AEC on Oil Palm producers in Thailand that the economic system will be the most positive impact, and the most negative impact would be environmental.

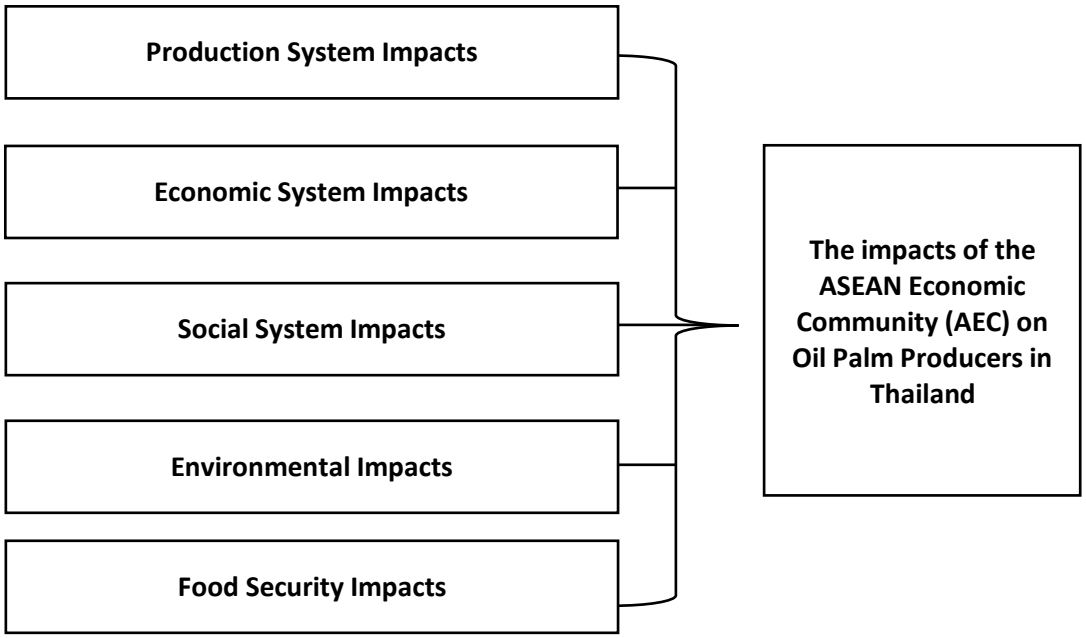
1.6 Scope of the Study

The first step in order to assess the impact of the ASEAN Economic Community (AEC) on oil palm producers in Thailand concerns the characterization of the AEC, how it is running, and what are the goals of this regional integration. We also need to identify which are the specific institutional vectors that will influence the production system.

Second, we need to understand how the oil palm production system works in order to foresee what kind of impact the system will have as a result of the achievement of the AEC. We will characterize the farming structure, the production system, the supply chain, and farmer's livelihoods to achieve our objective.

Finally, after having understood clearly the AEC and oil palm producers, we will proceed to identify the impact of the AEC in single market and production base policy on oil palm producers in Thailand. The overall impact of this institutional arrangement will be assessed by studying its impacts on specific aspects of oil palm producers, i.e., the production system, the economic system, the social system, the environment, and food security.

The study will use both quantitative and qualitative analysis. The population concerned by this study is oil palm producers in Thailand, and implemented in three provinces in Southern Thailand, which are Surat Thani, Krabi, and Chumphon, will divide the sample into two groups, smallholder 320 samples, and large holder 80 samples will be applied.



Source: From the study

Figure 1.1 The conceptual framework

In chapter 1, an introduction to the research was made focusing on the statement of the problems to study the impact of the ASEAN Economic Community (AEC) on Oil Palm producers in Thailand, the objectives of study which can divide into general objectives and specific objectives, the significance of the research to show the benefits of the research, the hypothesis and expected results, and the scope of the study.

In chapter 2, the theoretical framework, which focusing on the regional economic integration theory, regionalism, old regionalism, new regionalism, globalization theory, along with the regional integration in the world and Southeast Asia, in order to get an overview of changes in regional integration from the past to the present.

In chapter 3, the research methodology that use to obtain the required information about the impact of the ASEAN Economic Community (AEC) on oil palm producers in Thailand and achieve the objectives of this study was made focusing on the selection of study area which including the reasons to choose southern region and 3 provinces and the Characterization of study area, the data collection both in secondary and primary data, the sample size and sample selection in each area, and the data analysis which including descriptive and inference analysis and using Analytic Hierarchy Process (AHP).

In chapter 4, the ASEAN Economic Community (AEC), which focusing on the background of the AEC, the characteristics and important strategies to achieve the goal of regional integration. Besides, this chapter was focusing on the potential of Thailand among the other countries in ASEAN, together with the Oil Palm policy under the AEC framework.

In chapter 5, Oil palm, which focusing on the general knowledge of Oil Palm, the Palm Oil industry system in Thailand, the situation of Oil Palm in the World, ASEAN, and Thailand. This chapter will give an overview of and competitiveness of oil palm production in Thailand

In chapter 6, the result and discussion, has described shortly about the characteristic of the study area in the general and socioeconomic condition which was obtained from secondary data and literature review, and will also focus on the general information of farmer (sample), general information of oil palm production in the study area, and farmer's perception of the impact of the ASEAN Economic Community (AEC) on each of specific domains

In chapter 7, conclusions and recommendations which derived from the research results and sums up the key points of discussion, together with the limitations of the study and the suggestion for future research.

CHAPTER 2

THEORETICAL FRAMEWORK

2.1 Regional Economic Integration Theory

The current situation in the world, which is highly competitive, causing countries in the world not to be able to live alone. The way that every country acknowledges that it will help achieve that goal success and helps to create more bargaining power, which is "economic integration."

May consider the reasons for economic integration in four dimensions, which are:

1. The imbalance of the rate of economic growth in different regions of the world. The face is the developed countries are industrialized before developing countries, including Japan. Therefore, many products have been continuously exported to developing countries from 1970 to 1990, resulting in countries in East Asia having quite high economic growth rates continuously for many years.

Thus, European countries have grouped as European Union (EU), and in America, they are united in the name of the North American Free Trade Area (NAFTA), to create bargaining power or to prevent trade with countries that are not members of the group. In this way, developing countries and countries in other regions, both developed and developing countries, have come together to avoid losing trade benefits with other various economic groups. For example, Asia has established the ASEAN Free Trade Area (AFTA), where Thailand is also a member of the group.

2. Borderless economy, also known as "Globalization," which more recent phase began in 1980. Production, investment, and employment are expanding across borders between countries, allowing countries in the same region or similar regions to realize the benefits of combining the different production resources so that countries can use them together inside the region.

The combination of resources creates cross-border investments and production, which allows each country to use its production resources more efficiently, with lower production costs, and increased return on investment.

3. In order to help cooperation within the region. Mostly the most developed countries in the group must help the less developed countries, either by grants or loans at low-interest rates. In order to strengthen the countries in the group for more comparable and reducing inequality among member countries.

4. For the benefit of international politics because economic and political benefits tend to be closely related.

Regional integration has been a growing tendency since 1945, especially for economic purposes (Cumbers, 2009), and for removing all difficulties and trade barriers, especially during the mid of 1960, many countries use regional economic integration as a tool for trade and economic development within the region. For example, from all around the world, Benelux Economic Union (BEU), ASEAN Free Trade Area (AFTA), Southern Cone Common Market (MERCOSUR), North American Free Trade Agreement (NAFTA), and the most remarkable is European Union (EU) (Plummer, 2006), and the latest one is the ASEAN Economic Community (AEC), which is the largest integration effort attempted in the developing world (Petri, et al., 2010) and was supposed to move forward in the integration in 2015. A single market and production base should be created then with free movement of goods, services, foreign direct investment, and skilled labor.

The main reason that motivated people to study regional economic integration is European Economic Community (EEC) in 1957, and European Coal and Steel Community (ECSC), from those situations, Balassa (1961), the Hungarian economist, professor at Johns Hopkins University and a consultant for the World Bank, has given the definition of regional economic integration as a process driven by the government to remove economic barriers between the regions by using regional cooperation through the trading agreements. Regional economic integration can be classified into five categories.

1. Free Trade Area (FTA): The members that have few or no price controls in the form of quotas or tariffs between each other but can use these price control strategies with non-member countries. For example, the European Free Trade Area (EFTA), the North American Free Trade Area (NAFTA), and the ASEAN Free Trade Area (AFTA).

2. Customs Union: Agreement between countries to remove trade barriers and eliminate or reduce customs duty on mutual trade. A customs union (unlike a free trade area) generally imposes a common external tariff (CTF) on imports from non-member countries and (unlike a common market) generally does not allow free movement of capital and labor among member countries.

3. Common Market or Economic Community: Free movement of goods, services, foreign direct investment, and skilled labor among member countries.

4. Economic Union: A common market involving more than one nation based on a mutual agreement to permit the free movement of capital, labor, goods, and services. An economic union can also require the coordination of various social, fiscal, and monetary policies among participating nations.

5. Total Economic Integration: Represents the potentially most advanced form of integration with a joint government and where the sovereignty of member countries is significantly reduced. Only found within nation-states, such as federations where there is a central government and regions have some level of autonomy.

The most famous example of regional economic integration is the European Union (EU). The European Union is a group of countries in the European region which governing common economic, social, and security policies in a state-style of "Supranational Institution", the largest and most advanced in the world with the aim of building a permanent peace between countries in the European region after World War II, including strengthening the economy of member countries and makes the EU as a leader in the global community.

The process of transferring administrative powers from a member state to a European Union supremacy is gradual. The first concrete grouping took place in 1950. After World War II, six Western European countries jointly formed the European Coal and Steel Community (ECSC). The ultimate goal of the coalition was for political gains. Each country has chosen to use economic integration to reduce the suspicion of countries about the loss of sovereignty.

The integration was successful. Therefore, in 1957, the group expanded to cover other economic sectors. Each country has signed the Treaty of Rome to establish the European Economic Community (EEC) as both for the customs union and the common market. The integration process is very successful in the economy sector.

In 1990, after the Cold War, France and Germany proposed the establishment of a European political union in order to establish a joint foreign and security policy, which ultimately led to signing the Treaty of Maastricht or Treaty on the European Union to establish the European Union in 1992, including the use of Euro currency together in between member countries.

Later, in 2007, EU member countries realized the need to improve the structure in response to the progressive integration within the EU and the growing role of the EU in the world community to sign the Lisbon Treaty, which member states have agreed to renounce some

sovereignty over national cooperation on (1) customs union (2) competition rules (3) monetary policy for EU member states using Euros (4) conservation of marine biological resources under the common fisheries policy, and (5) a common commercial policy. The Lisbon Treaty has affected since 2009.

The EU has 28 member states with a common market system, a joint tariff system, use Euro currency together in 17 member countries, and has an administrative center in Brussels, Belgium. Until June 23, 2016, the British Prime Minister David Cameron (at that time) announces a referendum titled "Should the UK still be a member of the European Union or leave from the European Union?" which lead to the majority vote for "leave" (won by 52 percent to 48 percent). Brexit (British-Exit) was originally due to happen on March 29, 2019, but the date has been delayed twice. The UK government says it is focused on getting a new deal agreed at an EU summit on October 17, 2019. This will push the deadline back from October 31, 2019, to January 31, 2020. Then the European Union will only have 27 countries.

Thailand attaches importance to the European Union as an economic power and a large market with a population of over 500 million people, the Gross Domestic Product about 12,600 billion euros, and the region with the highest purchasing power in the world. The European Union is a giant in the world trade arena with high bargaining power and has a role in determining the direction of international trade. By being a leader in the rules and policies of trade and non-global trade (Global Standards Setter), the European Union is the fourth biggest trading partner of Thailand, after ASEAN, Japan, and China. Major exports from Thailand are computers, gems, rubber, automobiles, ready-made garments, electrical circuit boards, electrical appliances, chicken, and fishery products. Major imported products from the EU are machinery, chemicals, aircraft, scientific equipment, steel products, and vehicle components. Investment statistics in the year 2015 shows that EU member countries have net direct investment in Thailand of around 2,187 million US dollars. It is the second-largest investor after Japan. The total investment value is over 32,615 million US dollars (Department of European Affairs, 2019)

In addition, the European Union attaches importance to Thailand as a close country of the European Union in Southeast Asia and tries to increase its role in this region through cooperation in various ASEAN frameworks such as ASEAN-European Union (ASEAN-EU), and in the ASEAN Regional Forum (ARF), where the EU recognizes democracy, respects human rights, the laws, and free trade system. The strategy of Thailand to the European Union

emphasizes that Thailand adheres to democratic values, including the free trade system as well as the European Union, in order to ensure the EU's confidence in the stability of the democratic regime of monarchy and to see Thailand as the primary partner in the region, which will help expand trade, investment, tourism, receive technology and innovation from the European Union, and to promote Thailand's long-term competitiveness.

Smouts (2003) has talked about regional economic integration is the process that all states in the region can have more interaction between each other and will lead to a stable economic situation and political unity as well. There are three critical criteria concerning regionalism: (1) the states must be close to each other in geography (2) the interaction increasingly between the states, and (3) have an idea to share the value and benefit between each other.

Haas (cited in Falk, 1967) has described the regional economic integration with the neo-functionalism theory. Found that the nation-state is not stable enough because it has a limit boundary, that makes the international system more critical in order to develop the country. "Integration is the thing that can describe how the states agree to complete loss of sovereignty, and why they are willing to join in regional economic integration, it all just because they need to solve the conflict between each other and can develop together in the future," Hass said.

Keohane and Nye (cited in Greensteine, 1975) have described regional integration as the participation between the states that have many dimensions, including economic, political, social, in which each state is interdependent. Keohane and Nye had the idea that the highest stage of the integration between the states is "Political Integration," which must be “institutionalization and supra-national.”

2.2 Regionalism, Old Regionalism, and New Regionalism

Regionalism is a relevant theory that talks about the relationship and interaction between the countries, especially after World War II. Fawn (2009) has described that regionalism happened because countries have a very close boundary, similar culture, economy, language, and policy, as well as history. The regionalism has happened for a long time since the 19th century, for example, the German Customs Union (Zollverein) in 1833, Cobden–Chevalier Treaty, an Anglo-French Free Trade Agreement signed between the United Kingdom and France on January 23, 1860.

Breslin (2007) said regionalism is the theory that tries to explain the pattern of official interaction between the states into agglomerate, which is from the result of the contract and agreement that members of the state have done together. Regionalism is an essential component of the world trade system, including unilateralism, regionalism, and multilateralism.

About the Regioness theory, as Hettne (cited in Fawn, 2009) said, it is the potential of each region that shows identity and benefit to another region. "Regioness" might be the same as "Actorness."

Hurrell (2007) discusses the definition of "Regionalism" that regions are often analyzed in many dimensions (1) the dimensions of social solidarity, including race, ethnicity, language, religion, culture, history, and common sense of heritage, (2) the dimension of economic solidarity such as trade patterns and economic cooperation, (3) the dimension of political solidarity issues, including regimes and ideals, and (4) the dimensions of international organizations, the existence of official regional institutions, mainly focusing on the interdependence concept within the region. However, there is still no clear definition of the region as a science because the indicators of regionality vary according to specific problems or issues that need to be studied.

In addition, different regions are called "Social Creation" based on ideas, beliefs, opinions of researchers, being related to the subject of political competition as well. Therefore, it is necessary to classify the regional meanings as qualifying and as it should be an ideal or concepts that have five different explanation process to understand the concept of regionalism as follows (Hurrell, 2007):

1. Making the same region or regionalization, means social integration and is often an indirect process of economic and social interactions, or that the predecessor regional thinkers called as “informal integration of soft integration” which regionalization does not depend on the implementation of government policies or state groups but it is the result of economic power, social, and cultural aspects that spread as informal economic-society integration but intensive, such as China mainland, especially around the area of Hong Kong, Taiwan, and Southern China, or Northern Mexico, and Southern California.

2. Regional identity and awareness. Even though "Regional Awareness," "Regional Identity," and "Regional Consciousness" are abstract and ambiguous, but that is something that cannot be ignored. Especially in political issues, which became the core of the contemporary regional analysis.

Therefore, as with the region, it may be seen as “imagined communities” that adhere to the spiritual map that emphasizes certain matters and neglects or abandon other matters, as in "Regional Awareness", emphasizing the importance of mutual awareness in the region or in the meaning of regionalism that embraces cultural awareness and mutual understanding history and the politics of member states within the region

3. Inter-state cooperation means close cooperation of member states in the region and agreements between the overlapping states, or networks of regional cooperation regimes on various issues, which the cooperation may respond to various purposes or meet challenges from outside the region, or regional cooperation in international institutions, or international conferences to negotiate benefits. Besides, inter-state cooperation will lead to welfare, security, and promoting shared values, finding solutions to common problems, especially problems arising from the increased independence within the region.

4. Regional integration in which the state has a leading role means policy decisions are made by member states in the region, in order to eliminate barriers of trade, services, capital, and labor. This concept is considered a subjective definition of regionalism.

5. Regional solidarity creation. Regional thinkers tend to be obsessed for thinking or the goal, to change the role of the national state and the transfer of some sovereignty to a new political organization within the region or community, but actually, the form of creating regional solidarity has a wide range of dimensions, such as the region has a dominant role clearly in the relationship between the states within the region and the rest of the world. Regionalism

plays a vital role because it makes the state that does not participate in the region or the regional agreement must pay the price for both economic and political values from not participating, especially when the region becomes an essential organization in the formulation of regional policies to solve a variety of significant problems.

The old regionalism is a theory which explains cooperation between the states in the same region or the cooperation between the state that has closer border, agree to establish international cooperation organization to develop economics, social, political, and including economic union, which has a decision together to set the economic, financial, and monetary policies, to enforce with all member states. This concept only uses until 1980 (European Union) because, at that time, the member state only can be in one group of regional integration (Fawn, 2009). During 1980-1990, the agreement of international economic cooperation has opened to the outside (between the region), and it is a starting point of the new regionalism theory.

The new regionalism has established from the development of the cooperation between the region (during 1980-1990) or called "open regionalism." Bergsten (2009) said about the open regionalism theory in international relations. It is reflecting the efforts to resolve global trade problems, amidst the region's popularity that is increasing in intensity and when emphasizing that regional agreements or the establishment of regional groups in order to strengthen trade liberalization and investment is open to globalization rather than being a trade group that is a barrier to free trade in the world.

Acharya (cited in Jittasevi, 2009) talked about the old regionalism as a country integration which still has a border or limitation, not cover all over the world. Moreover, an academician has followed up, observed, and developed concepts to define "regionalism" in many ways, such as the concept that based on that principle that a region must have an economic core, security, cultural links already exist naturally. While the Social construction concept constitutes a region consisting of social and political construction comprising the concept of metaphors and actions that determine what is the region and who should be in or outside the region.

Old regionalism is a concept that tries to explain the nature of state cooperation within the same region or cooperation between states with areas that are close to each other, agreed to establish an international cooperation institution for economic development, political society,

until reaching the economic union which has a decision to set economic, fiscal, and financial policy apply to member states, which is the concept used to describe the cooperation between states in different regions from the 19th century until the decade of 1980s, or could only be explained by the European Union in the 1980s because it was the period that members of the regional groups are often affiliated with a single regional group (Fawn, 2009).

Due to the development of international trade cooperation agreements in 1980-1990, it was opened to the outside of the region. Therefore, explaining the regional development of international relations, academicians must be changed according to time and situation. Explaining the development of regionalism requires a period of time and cooperation to explain and is the arrival of the New Regionalism concept.

New regionalism caused by the development of the agreement “Cross-regional” economic cooperation or between region to region in the period 1980-1990. For this reason, international relations academicians called this phenomenon a “New regionalism” or “Open regionalism" for the past 30 years, and all regions have turned to make trade agreements between each other. It is evident from the establishment of Asia Pacific Economic Cooperation (APEC). Especially after the failure of the World Trade Organization meeting in Doha, all states turned to “loose” economic cooperation. Therefore, the new regionalism does not explain the cooperation between states that focus on the creation of institutions or national organizations to define cooperation rules like old regionalism that describes cooperation through institutions that occur in the case of the European Union. New regionalism used to describe the cooperation between states that are more open to developed and developing countries and have comprehensive cooperation of the other factors other than the state, this can show that the cooperation of various sectors or the support from the public sector is also an essential factor in the success of this New regionalism framework.

Bergsten (2009) said that the open regionalism concept in international relations, reflecting the efforts to resolve global trade problems amidst the region's popularity that is increasing in intensity and when emphasizing that regional agreements or the establishment of regional groups in order to strengthen trade liberalization. Investment is open to globalization rather than being a trade group that is a barrier in the world of free trade. Therefore, Bergsten gave the following definitions of open regionalism, "which members who enter this open regionalism group are willing to follow the rules of the organization that they will become

members of the establishment. Such as Asia-Europe Meetings (ASEM) and the establishment of the APEC group.

Fawcett (cited in Jittasevi, 2009) studied and analyzed the regionalism in the Middle East but interpreting the word "region" that can be viewed in many ways, the broadest, the region is the part of a large area, or in some cases, the continent or the land on the earth. In other cases, the region may be the same as the nation with a "community in the imagination" in the case of mutual feelings of being a national state, which according to this means that one region will live together as a region based on tradition, experience, ordinary conduct. A region is a group of various states that are linked together, both by geographic relationships, and a certain degree of dependence.

From research on the meaning of Regionalism, Old Regionalism, New Regionalism (Or Open Regionalism) as well as the Regionalization, it can be seen that the above concepts are linked together to explain the development of regional cooperation as well as the region. Regionalism and Regionalization, both are processes or guidelines for the development of regional cooperation that is complimentary for the solidarity of the Regionalism and New Regionalism, which may not be strong enough without the process of Regionalization. At the same time, the process of Regionalization requires strength and direction from Regionalism and New Regionalism as well.

2.3 Globalization Theory

From the emergence of Globalization phenomenon since 1990 Affecting the expansion of economic activities between countries in the world, including trade, investment, finance, movement of production factors, transportation, and logistics.

In the past two centuries, many countries have driven their economy according to globalization. Even in the last decade, trade patterns and production processes of the countries in the world emphasize the linkage of economic activities that create added value at each stage of production to the final consumer or are often referred to create additional value in the production chain (Global Production Network), or the creation of the global value chain. The efficiency of participation in the global value chain is often used to describe the effectiveness of globalization. Thailand is one country that drives the economy according to globalization as well. The level of globalization of Thailand is likely to increase continuously between 2008-2012, with the first result of the globalization of politics, followed by economic globalization.

Globalization is a process that makes the world more intensely connected and expanded as a result of the free transnational movement of labor, service, and products or more exports and imports, including capital, labor, and population (Kim, 2009). For example, there is a continuous movement of workers and populations more moved the capital to foreign countries and accepted foreign investment in the country, as well as technology, the flow of international development or research both in terms of communication technology and development, such as using mobile phones. However, globalization is not limited to just economic development. There are also other dimensions, such as social, cultural, political, and for our world that consists of more than 200 large states. Many people have studied the globalization characteristics of the countries using the indicators such as political, social, and economy named KOF-Index of Globalization of Swiss thinker, Axel Dreher, which ranks each country with a scale from one to one hundred appears that for 2018 KOF Globalization Index, Belgium is a country that has the most globalization in the world with a score of 90.47. One of the supporting factors of Belgium is to be located in the heart of Western Europe, has a convenient transport infrastructure, Brussels, which is the capital of the European Union or the headquarters of the European Union. Therefore, it is the center of the movement of goods, services, capital, labor, population, technology at all times, uninterrupted. In addition,

Belgium is a member of the European Union with the law that allowed the free movement of the capital, goods, labor, and population called “Single Europe" as well, for more globalized countries, followed by the Netherlands, Switzerland, Sweden, and Austria, which is very interesting that these mostly countries are under the “Single European” law (with the score of 90.24, 89.70, 88.05, and 87.91, respectively). The countries with the least globalization characteristics are the Virgin Islands (U.S.) and West Bank and Gaza, which ranked in 208 and 209, respectively. Thailand ranked 60 with a score of 68.15 (ETH Zurich, 2019).

Friedman (2007), in the book "The World is Flat: A Brief History of the Twenty-First Century," said that our world has gone through the era of globalization for three periods. The first generation or globalization 1.0 (A.D. 1492-1800) when Christopher Columbus traveled to explore the sea route, opened a trade route between the old world (Western Europe) and the new world (US) to seek natural resources and land or called as the colonial era. It can be said that in Globalization 1.0, the state is the primary key to change and catalyzes global integration. It is an era in which the world has reduced from enormous size to medium size. All countries use their power to expand their influence on the other.

The first question of this era is, "How will my country compete with other countries in the world?"

The second-generation or globalization 2.0 (A.D. 1800-2000), was during the economic recession, the emergence of both World War I and World War II. The globalization process accelerator is a multinational corporation that in the early of this era benefited from lower transportation costs as a result of the invention of the steam engine and railway. While the second half of the era has accelerated is communication costs are lower as a result of the fusion of many types of technology, including telegram, telephone, personal computer, fiberglass Cable, and internet. It can be said that in this era, the world is shortened from medium to small.

Nevertheless, for the third generation or globalization 3.0, this is different from the first and second generation, because in the first and second generation, the accelerated process of globalization including individual sectors, European, and America. Although China was dominant in the global economy in the 18th century, it is a Westerner who explores the world and organizes the world.

However, in this third era, the globalization process has individuals in every corner of the world, which is an important catalyst. Therefore, in this era, the world is shortened from small to flat by the power of individuals who are cooperative with the use of a personal computer as an essential tool. This tool will help individuals to enter the world of the powerful and capable Internet network to create a formidable power, to negotiate with the state as well as the business of trading, and transnational service is free without borders from software advances. So, in this era, individuals are able to show their role and compete with the company, and the company can do other transactions to reduce costs as well.

Furthermore, Friedman (2007) also said that ten important powers make the world flat. Which such power is caused by a combination between political change, the origin of innovation, and business operations of the various companies, with all ten powers eventually leading to new forms and tools in the collaboration of individuals caused the world flat, all ten powers are:

1. The power that makes the world flatten. The first power is the collapse of the Berlin wall, which is the era of the new creation. The collapse of the Berlin Wall on November 9, 1989, was the beginning of the liberation of the people in socialism to have a free life. The balance of power throughout the world has changed to support the democratic approach. The retreated from the support of the government with total power and control of economic activities and planning from the center. The innovation that occurred during this time was the Windows program.

2. A new connection. When the “World Wide Web (WWW)” became widespread, and Netscape became a public company on August 9, 1995, resulting in internet usage is popular around the world, which connects communication between users of various computer systems until the "Dot-Com Boom" occurs leading to investment in fiber optic cables connecting global communications. The cost of sending data documents has been greatly reduced because of the presence of the internet. People can send a letter by email or in digital form and can send pictures to the world as quickly as possible.

3. The software helps the workflow. It is the data linked from one unit to the relevant agency. Sharing knowledge and collaboration between individuals who are in different places and times.

4. The uploading technology. It is the power of the online community. Upload technology has become one of the most exotic forms of cooperation in the world. There are many people

creating content on their own or share with others, to disseminate ideas around the world. This power allows individuals and communities to submit their work and opinions online. People will change the status from the recipient to the provider and contributors. Besides, people who have access to information through uploading will become more knowledgeable as if they were studying at a world-class university.

5. Outsourcing. It means assigning or hiring a skilled external person to do some work for us or working together. An obvious example is India, which has been affected by outsourcing. The main reason is due to the sharp vision of past leaders by promoting public education that focuses on science, engineering, medicine, continuous improve population quality can be compared to preparing the man skilled and also lead to outsourcing communications technology and others from the United States to India, making India is the center of labor with expertise in communications technology worldwide.

6. To move production bases overseas (offshoring), including lifting the whole plant to a foreign country, but the production process and the product remain the same by linking with the supply chain for the advantage of lower labor costs and energy assistance.

7. Supply-chaining is a collaboration between one manufacturer, wholesalers, and customers to create value-added. Examples of the excellent supply chain in the world are US Wal-Mart companies, which is the largest retail company in the world but did not produce the product itself, which Wal-Mart produces is the most efficient supply chain in the world, by utilizing Radio Frequency Identification (RFID) technology to transport products.

8. Insourcing. It means that companies see an effective alternative, not limited to areas in the world where they can sell products at higher prices, more quantity, or produce lower-cost products, or buy cheaper materials, or work for other companies as well, which is truly making the production and delivery of products connected to the world level.

9. The informing is to create and drive their supply chain. That contains information, knowledge, and others that can easily find information, knowledge, and communication through the Internet, including Google, Yahoo, and MSN, or the individual learning to apply concepts in outsourcing, insourcing, supply chaining, and offshoring to benefit themselves.

10. The steroids, which have four components: computer system, the advance of file-sharing technology, both music and video files, advances in Internet telephony technology by using

a personal computer, a notebook, which is a private service that sent to each other in virtual. The fourth stimulant is video conferencing, where each participant will sit facing the large flat-screen TV with a camera attached to the participants. The monitor will take a picture of the participants at another location anywhere in the world, just like meeting at the same place. Therefore, all four stimulants help to enhance the six powers that have been mentioned, outsourcing, off sourcing, upload, supply chaining, insourcing, and informing. The steroids with help all six powers in a digital, mobile, personal, and virtual.

Can see that currently the globalization is defined by the flow of information, which is different from the past, focuses on the flow of trade and investment between countries amid the rapid economic, technological, and social changes. The world is facing globalization in another form that has changed from the past. People are lined up through intermediaries like the internet and online media or digital platforms. Digital globalization became the definition of the modern world in which technology develops leapfrog compared to the past decade.

After the economic crisis in 2008, global trade and international investment flows decreased and still could not be recovered, but the volume of information and international internet transactions increased more than 50 times more than 2.5 billion people, over 200 billion emails are exchanged, communicated through the online world. Digital globalization significantly increasing, the economic and business growth of various countries around the world every day. Digital globalization flows create opportunities for both entrepreneurs and consumers never like before. The digital platform reduces the cost of contracting and transacting across the country and causing unexpected new economic and business opportunities.

Besides, Friedman (2007) also discussed the triple convergence. The first convergence occurred in 2000, which is the moment when the ten powers of the flat world began to converge and to work in harmony with each other until the field of a rectangular screen or a flattened kingdom covering various areas of the world, and when a new competition occurs companies and individuals began to adjust their business. Therefore, the second convergence was the combination of technologies that occurred in the 2000s to work, resulting in increased productivity with work that supports each other, reducing production costs, and saving time. The third convergence is that many individuals in different parts of the world have been enclosed economies such as China, India, Russia, Eastern Europe, South America, and Central Asia. More than 3,000 million people gradually have a more liberalized political economy in

the 1990s. Therefore, those individuals are free to compete in the free market, and they come to meet the new stadium with new business methods, with the ten powers and tools to help workflow by going through a rectangular computer screen with a price that fasts and easy to find like never happened before, and with cooperation from anywhere in the world when the world is flat, it can be seen that the current and trends of globalization today are different from the past or globalization in the colonial era, or before that, in three aspects, the speed of change, the amount of change, and a variety of changes (Kim, 2009)

2.4 Regional Integration in the World and Southeast Asia

Regional economic integration is one of the ways to develop a country under the current mainstream. Many regions outside of ASEAN have experienced this before. For example, Western Europe can be seen from the European Union that uses this approach to create co-forces to restore regional integration after damage from both World Wars and succeeded in establishing a financial union or Euro area, in which most of the member countries use the same currency as well as sharing trade rules, both within and outside the continent.

Even in Africa, which is a vast region, each sub-region on this continent uses an integrated approach to economic development in accordance with the recommendations of the United Nations Economic Commission for African (UNECA) in the early 1980, as can be seen from the establishment of many regional economic communities on the continent, such as the Economic Community of Central African States (ECCAS), Economic Community of Great Lakes Countries (CEPGL), Economic Community of West African States (ECOWAS), Southern African Custom Union (SACU) and the latest at the continental level, 53 states in Africa have established the African Union (AU) as the primary mechanism for driving continent development and restoration to support regional economic integration.

The experience and success of the economic integration in Africa are different from Western Europe because of the obstacles in the infrastructure, the lack of money, the lack of expertise in human resources, and the problems of membership in overlapping regional groups. Nevertheless, what is clear is that every region in Africa has tried to operate in an integrated economic framework.

Besides, important regions as America established the North America Free Trade Agreement (NAFTA) in 1990, which combined Canada, Mexico, and the United States. It also aims to establish a free trade area of America consisting of countries in the Americas throughout the continent, including North America, Central America, and Latin America. At the same time, Latin America has developed in this regard. This phenomenon suggests that regional economic integration is a distinctive way that each region uses as an economic development approach because it is believed that the reduction of trade tax barriers will lead to trade expansion and helps the population to consume products at a lower price. However, what is more politically relevant is that when countries in the region have trade rules, economic, social, cultural

sharing, it will cause the power to negotiate with countries outside the region in all its dimensions, both political and economic stability (Julpanont, 2012).

In Southeast Asia, the experience of economic integration in the framework of the Association of Southeast Asian Nations or ASEAN, beginning in 1992, when the Cold War had just ended. Thailand, by Mr. Anand Panyarachun, had played an important role in strengthening cooperation between ASEAN members together when so-called the communist threat ended. Therefore, the ASEAN Free Trade Area (AFTA) is a new destination for ASEAN cooperation in an international context that has begun to divert the way for more external trade and investment. Economic cooperation in a more in-depth regional framework, also known as the era of regionalism, is booming, even though achieving AFTA in the framework of ASEAN took up to 18 years (1992-2010) on the journey, which as a result of the relaxation of the rules of trade between each other will cause the amount of trade between ASEAN members to expand, seen from the Thai-ASEAN trade volume, have more trade volume than trade with existing markets such as the US or Japan (Veit, 2009).

In this regard, the integration of the economy within ASEAN does not just stop at AFTA, but there are ways to integrate more deeply to the level of "single market", as can be seen from the year 2002, Singapore proposed to establish "ASEAN Economic Community" as shown in the ASEAN Cooperation Declaration in Bali, Indonesia on October 7, 2003, in order to keep pace with the development of the global trade and political system that is likely to be divided into seven major poles by continent, namely (1) North America, (2) Latin America, (3) European Union, (4) Russia, (5) China, (6) South Asia led by India, as well as (7) ASEAN (Veit, 2009). Besides, at the 12th ASEAN Summit in 2007 in Cebu, Philippines, ASEAN leaders announced the Cebu Declaration on the speeding of the Establishment of the ASEAN Community by 2015, which is the source of the signing of the ASEAN Charter in 2008 to provide a legal basis for ASEAN integration and there is a commitment to each other and for the efficiency of ASEAN in responding to new confrontations as well as promoting unity in the integration of member countries into the ASEAN Community (Julpanont, 2012).

The community, as mentioned above, consists of three main communities, namely the ASEAN Political-Security Community, ASEAN Economic Community, and Cultural-Social Community. In this regard, the ASEAN Charter in Chapter 1, Article 1, states the objectives of ASEAN in relation to the ASEAN Economic Community that "to create a single market and production base" that is highly competitive and with economic integration which has trade facilitation

and efficient investment with free movement of goods, services, capital, skilled labor, and investments that are convenient for businessmen and professionals, talented and skilled Thai workers, Thailand as member who has played an important role in establishing ASEAN since the beginning, has focused on the establishment of "ASEAN Economic Community" has always been the first (ASEAN first policy), that ASEAN must come first, because of the tight integration of ASEAN will help to increase the competitiveness of ASEAN including Thailand in attracting foreign direct investment as well as helping to build the bargaining power in this regional and multilateral negotiation framework, and strong foundations will make Thailand international connection more efficient.

CHAPTER 3

RESEARCH METHODOLOGY

In order to obtain the required information about the impact of the ASEAN Economic Community (AEC) on oil palm producers in Thailand and achieve the objectives of this study, the methodologies described below will be applied. First select the area of study, data collection, sample size, and the methodology to select the sample, and the last section is about the data analysis.

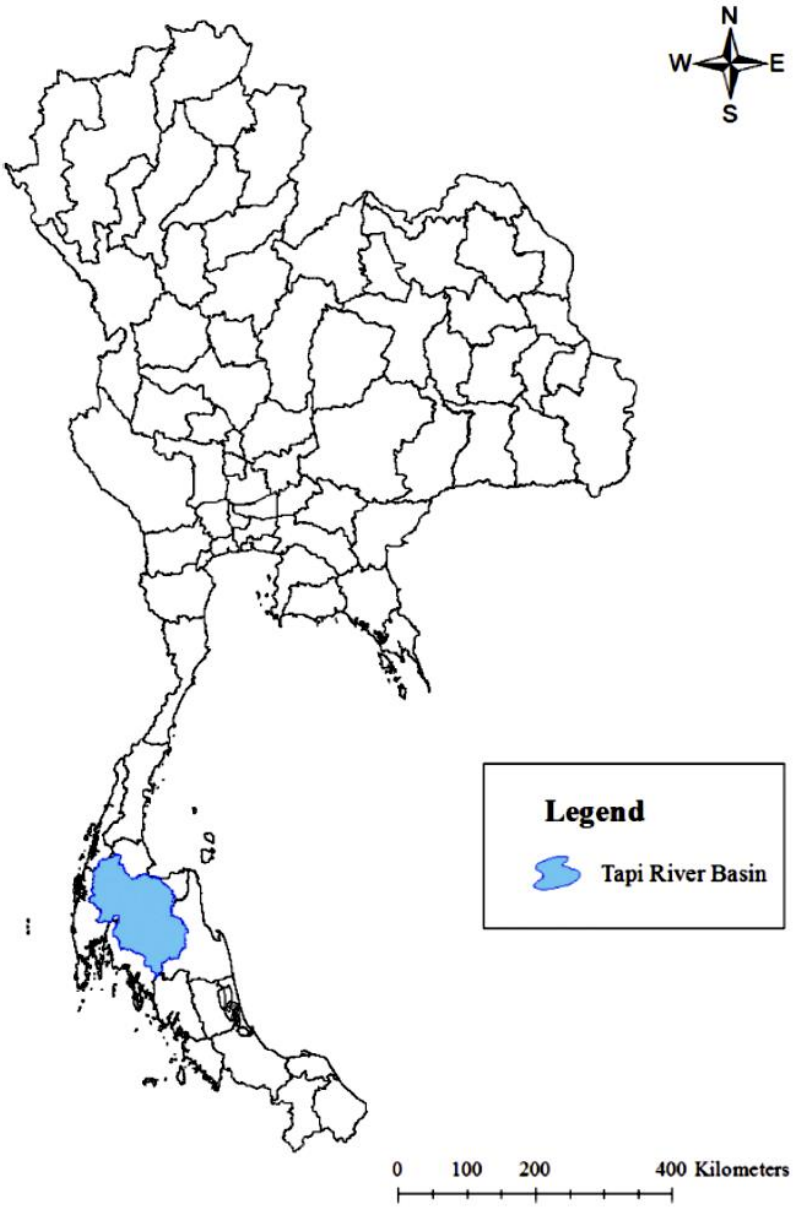
3.1 Selection of Study Area

3.1.1 Reasons to Choose the Study Area

About 60 percent of the total palm oil production in Thailand is from the Tapi River basin (Figure 6.2). It is the main basin in the South of Thailand with an area of 13,455 square kilometers, mainly covering three provinces: Surat Thani (69 percent of the basin), Nakhon Si Thammarat (17 percent of the basin), and Krabi (13 percent of the basin).

According to the study of the Office of Agricultural Economics of Thailand (2015), the total cultivated area of oil palm in Thailand in 2013 is 4,503,946 Rais of which 3,767,336 Rais are harvested. Southern Thailand accounts for a large part of these figures, the cultivated area of oil palm is 3,898,474 Rais, and the harvested area is of 3,379,848 Rais, which represents more than 85 percent of the total areas in Thailand.

The Office of the National Economic and Social Development Council (2019) reports that they have the plan to develop the integrated Oleochemical Industry Zone in Krabi, Surat Thani, and Chumphon province in order to be a new industry in the region and add value to palm oil, including promoting the production and distribution of products from the Oleochemical industry in foreign markets and develop cooperation in establishing a central standard oil palm production quality of ASEAN and the cooperation mechanism between neighboring countries (Malaysia, Indonesia, Thailand) as the world's largest palm oil producer in setting palm oil price standards, in order to increase bargaining power in the world market and create total price stability, both support the research and development of oil palm biotechnology and develop high-value products and development into a prototype factory.

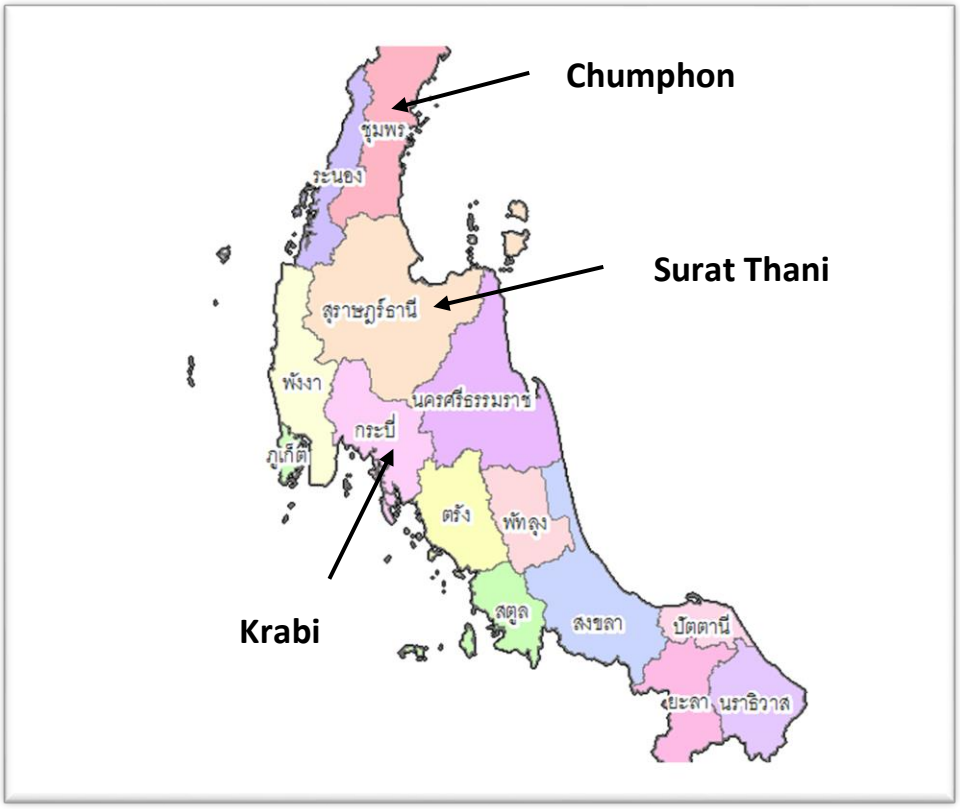


Source: Saswattecha, et al. 2015.

Figure 3.1 Location map of the Tapi River basin in southern Thailand

3.1.2 Characterization of Study Area

This field survey will be implemented in three provinces in Southern Thailand, Surat Thani, Krabi, and Chumphon. In 2013, Surat Thani province had the largest oil palm production area with 1,371,925 Rais, followed by Krabi province with 1,130,003 Rais, and Chumphon province with 1,083,349 Rais respectively (Land Development Department, 2013). Considering the total area of oil palm production in Thailand, these three provinces accounted for over 75 percent of all the country's oil palm production area.



Source: Thailand Geopark, 2017

Figure 3.2 Location map of the study area

3.2 Data Collection

3.2.1 Secondary Data

This should be by literature review and general descriptive analysis of the secondary data derived from published researches on regional integration theory, structure, and policy of the ASEAN Economic Community (AEC), impact of the AEC to member countries especially to Thailand and Thai's agricultural sector, oil palm production in ASEAN and Thailand, oil palm policies in Thailand, and impact of the AEC on oil palm producers and production in Thailand.

The probable outcome of trade liberalization for the producers and their household income shall be estimated using the general results on the impact of the AEC for producers and their particular activity. This measurement involves the calculation of the average income and expenditure structure of these producers, using the information on prices and production costs available in Thailand. Estimated changes in domestic prices, production, and cultivated area due to the AEC will then be applied to the productive structure.

3.2.2 Primary Data

The required data will be collected using two types of methods. The first method consists of field observation and surveys in three provinces in Southern Thailand. These are Surat Thani, Krabi, and Chumpon. This part of the study will use a questionnaire directed to a sample of 400 units, 320 units for smallholders, and 80 units for large holders. The questionnaire will contain three parts, including (1) general characteristics of the farmers such as gender, age, education, number of family members, (2) general information on oil palm production, such as total area, area of oil palm production, area of other crops (type of crops), and (3) farmer's perception of the impact of the AEC on each of specific domains, that are the production system, the economic system, the social system, the environment, and food security. The second method consists of in-depth interviews and focus-group discussions with concerned parties in the oil palm sector in Thailand, using semi-structured questionnaires.

The questionnaire that use to collect the primary data from farmers is distributed in order to gather information regarding farmer's perception of the impact of the AEC on each of the specific domains.

Part 1: General information of farmer (householder), which contained gender, age, education, number of a family member, and total income.

Part 2: General information of oil palm production which contained species of oil palm that the farmer grows in his area, year of oil palm, the crop that planted before change to oil palm, the reasons why farmer has changed from another crop to oil palm, number of family member that working on oil palm production, the responsibility between male and female in oil palm production activities, total area of family, total area that use to produce oil palm, average of income from oil palm production, land property right, production cost, total output from oil palm, and additional information of another crops.

Part 3: The impact of the ASEAN Economic Community (AEC), which contained five dimensions, including (1) the production system, (2) the economics system, (3) the social system, (4) the environment, and (5) food security. This part will use the 5-point rating scale to scaling responses in survey research, which are:

- the score of 5 is "Strongly Agree."
- the score of 4 is "Agree."
- the score of 3 is "Neither Agree nor Disagree."
- the score of 2 is "Disagree."
- the score of 1 is "Strongly Disagree."

3.3 Sample Size and Selection

3.3.1 Sample Size

The population concerned by this study is oil palm producers in Thailand. The total oil palm producer in Thailand is around 128,000 households (KASIKORN Research Center Company Limited, 2014). To determine the size of a sample in this study, we will use a simplified formula for proportions method by Taro Yamane (1973).

$$n = \frac{N}{1+N(e^2)}$$

n - the sample size

N - the population size

e - the acceptable sampling error[1]

This means $$n = \frac{128{,}000}{1+128{,}000(0.05^2)}$$

= 398.75 or around 400 households

Chavananand (2011) found that 80 percent of plantations in Thailand are smallholder farming systems. This study will divide the sample into two groups, smallholder 320 questionnaires, and large holder 80 questionnaires will be applied.

[1] 95% confidence level and p = 0.05 are assumed

3.3.2 Farmer Selection and Distribution by Provinces and Districts

This field survey will be implemented in three provinces in Southern Thailand. Surat Thani, Krabi, and Chumphon, which will separate by the district that has the large oil palm production by using purposive and snowball selection strategy, as the table below. (Office of Agricultural Research and Development, 2015).

Surat Thani: 5 districts, including Prasang district 24 samples, Thachana district 26 samples, Phunpin district 34 samples, Chaiburi district 13 samples, and Karnchanadit district 16 samples. In a total of 113 samples.

Krabi: 4 districts, including Kho Phanom district 24 samples, Aoluke district 43 samples, Plaipraya district 39 samples, and Klongtom district 36 samples. In a total of 142 samples.

Chumphon. Three districts, including Thasae district 88 samples, Patew district 30 samples, and Lamae district 27 samples. In a total of 145 samples.

Table 3.1 Oil palm production households, the sample of smallholder, the samples of the large holder in the study area

Area	Total Oil palm production Households	Samples of smallholder	Samples of the large holder	Total sample
Surat Thani				
- Prasang district	2,954	19	5	24
- Thachana district	3,163	21	5	26
- Phunpin district	4,070	27	7	34
- Chaiburi district	1,553	10	3	13
- Karnchanadit district	1,967	13	3	16
Total	**13,707**	**90**	**23**	**113**
Krabi				
- Kho Phanom district	2869	19	5	24
- Aoluke district	5160	35	8	43
- Plaipraya district	4678	31	8	39
- Klongtom district	4367	29	7	36
Total	**17,074**	**114**	**28**	**142**
Chumphon				
- Thasae district	10,647	70	18	88
- Patew district	3,625	24	6	30
- Lamae district	3,289	22	5	27
Total	**17,561**	**116**	**29**	**145**
Total	**48,342**	**320**	**80**	**400**

Source: From the study

3.4 Data Analysis

3.4.1 Descriptive and Inference Analysis

In this study, we shall use both quantitative and qualitative analysis. To answer the research question, we will use descriptive analysis to present the basic characteristics of the AEC and the oil palm production system in Thailand. We will also use basic statistics, including mean, variance, percentage to describe general characteristics, competitiveness, conditions, problems, limitations, and obstacles in the dimension relating to oil palm production in Thailand, ASEAN, and the world.

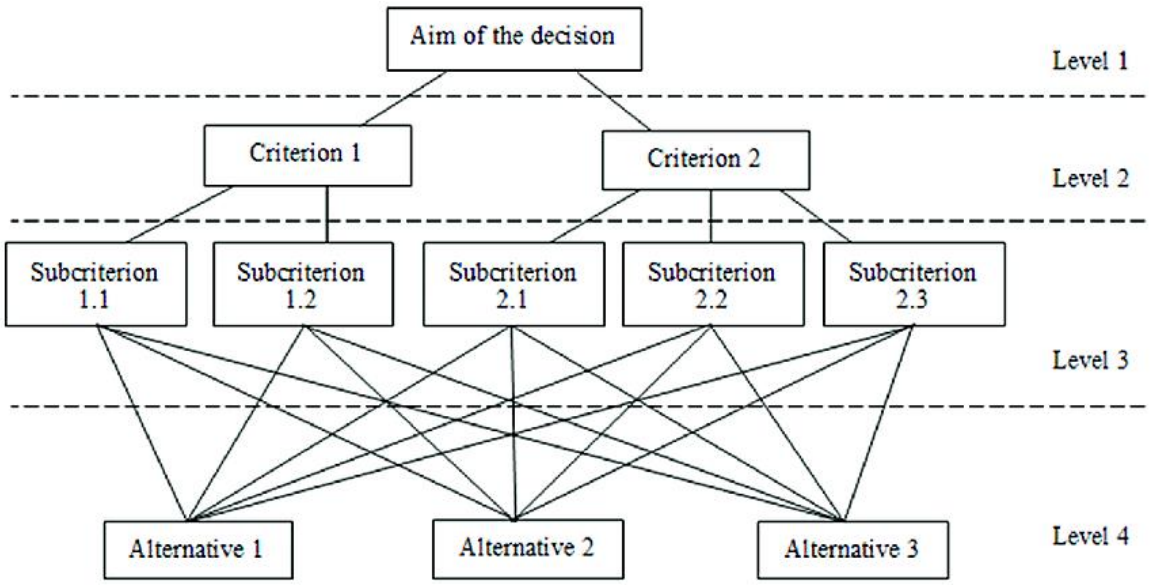
Besides, this research will use Cross-Tabulation Analysis, and ANOVA Test to study factors affecting oil palm production in Thailand. The hypothesis of this study is gender, age, level of education, and the farm size affect the oil palm plantations of farmers in Thailand.

3.4.2 Analytic Hierarchy Process (AHP)

To determine the impact of the ASEAN Economic Community (AEC) on oil palm producers, more specifically concerning the impacts on the production system, the economic system, the social system, the environment, and food security, we will use the Analytic Hierarchy Process (AHP). A five-point scale will be used as an expression of their relative importance, ranging from least significant with a score of one to most important with a score of five. This study has the hypothesis on the impact of the AEC on Oil Palm producers in Thailand that the economic system will be the most positive impact, and the most negative impact would be environmental.

Analytic Hierarchy Process or AHP is one of the methods that use for the decision analyzing in order to choose the best alternative, developed by Saaty in 1970 to be used as a tool for managers, which has simple principle is to divide the structure of the problem into multiple layers. The first layer is the goal and then sets the criteria, subcriteria, and alternatives (Saaty, 1980). The analysis can do by comparison analysis (Trade-off) criteria for selection, choose a pairwise option for easy decision-making, which criteria is the most important by giving a score based on importance or preference. After scoring to prioritize the criteria will consider each option according to the all criteria which the reasonable (consistency), then it will be able to rank alternatives to find the best option.

The analysis to decide the best choice will divide the analysis into hierarchies as follows: goal, criteria, subcriteria, and alternatives. In each layer may have multiple criteria, and each criterion may have many sub-criteria, the bottom layer is the layer of alternatives, as shown in Figure 3.3.



Source: Jankowski, J. 2017

Figure 3.3 Hierarchical structure in the analytic hierarchy process (AHP) method

The executives or experts or related persons will give the score of importance or preference by comparison of criteria or choice by pairwise comparison, starting from the top floor to the lower floor by dividing the level of importance or preference (AHP Measurement Scale) into nine levels as shown in table 3.2.

After knowing the opinions that the executives or experts or those involved in the form of priority scores or preferences from the comparison of pairs in that class will calculate the weight (Relative Priority) of the items in that layer, perform similar analysis by layer from top to bottom until complete then will know the total score of choice according to the specified criteria.

Table 3.2 Pairwise Comparison Scale

Quantity	Quality
Equally Preferred	1
Equally to Moderately	2
Moderately Preferred	3
Moderately to Strongly	4
Strongly Preferred	5
Strongly to Very Strongly	6
Very Strongly Preferred	7
Very Strongly to Extremely	8
Extremely Preferred	9

Source: Huizingh and Virolijk, 1994.

Analysis of decision making by AHP has eight steps as follows:

1. Set options. In each situation, there will be a variety of solutions. At this stage, specify various options related.

2. Specify the minimum level (Threshold Level) required of each alternative

3. Select the primary choice from the options given in step one by checking with the lowest criteria. If any choice is lower than the threshold, sort out.

4. Specify criteria or subcriteria to be used to decide the best choice from the choice in step three.

5. Develop the decision hierarchy of choice and criteria, which at least has three hierarchies: goal, criteria, and alternatives, as shown in Figure 3.1.

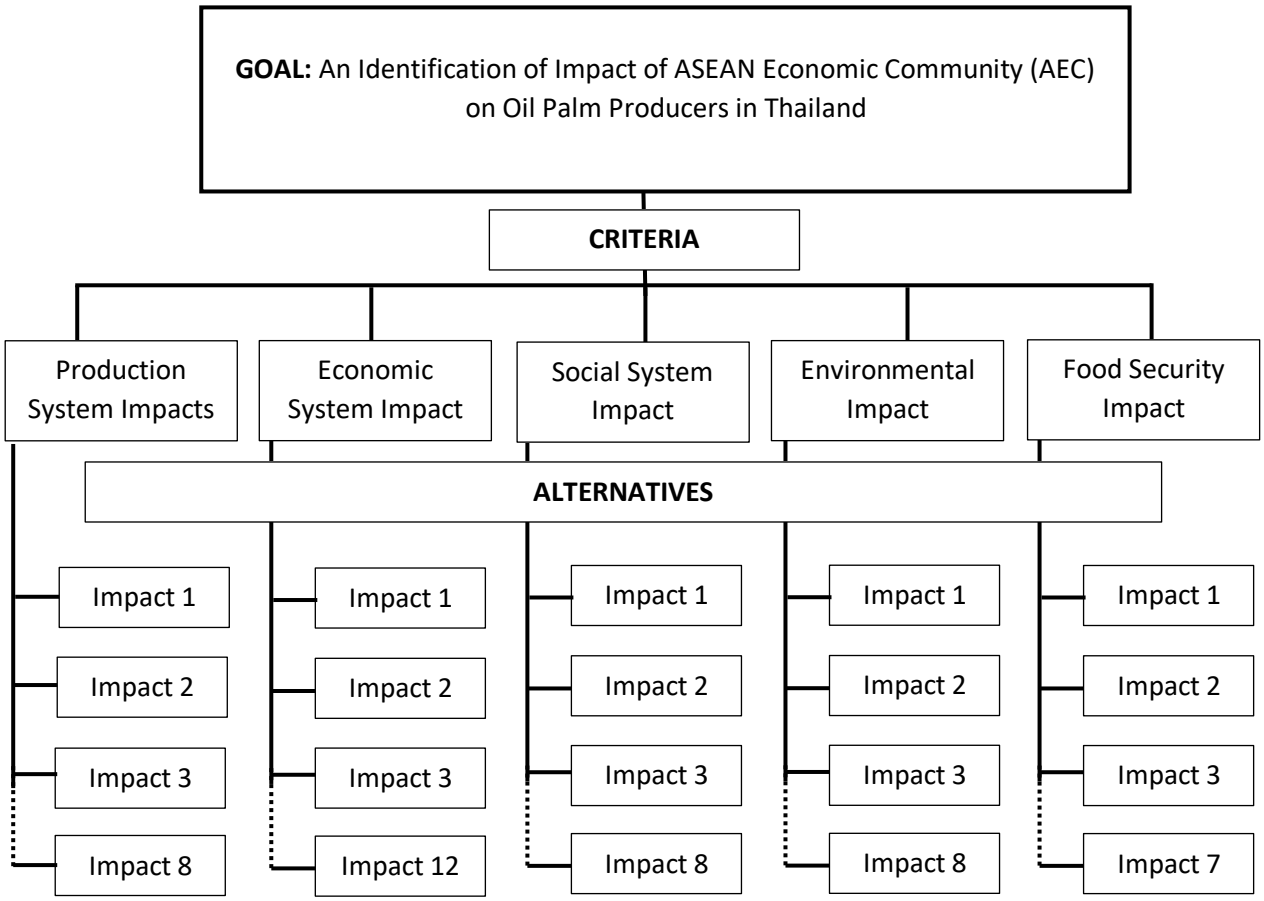
6. Compare the criteria by pairing and then compare the options by pairing according to the criteria set by each criterion until all criteria in comparison, the choice can be quantity or quality.

7. Calculate priority of choice by applying the weight of each choice in each criterion multiplied by the weight value of the criteria, then sum the results of sorting the results of each alternative according to the descending score. The choice with the most points will be the best.

8. Do the sensitivity analysis before deciding to choose an option from step 7. It is necessary to analyze the sensitivity caused by the uncertainty of the information used for decision making. If there is any change in the weight or importance of the criteria, is the best choice still the best choice? If it is, make sure that the choice is made.

Analytic hierarchy process (AHP) is a technique for decision-making (Saaty, 1977, 1980: Zhu and Xu, 2014) and has been applied to problem-solving in the last few decades (Shim, 1989) by many corporations and governments when making major policy decisions (Elkarmi and Mustafa, 1993). Many researchers are using this method to find an impact such as Okada et al. (2008) studying the impacts of irrigation projects on internal processes and crop yields, Chatzimouratidis and Pilavachi (2008) studied impacts of power plants on living standards, Opasanon and Lertsanti (2013) studied impact of logistics facility relocation, O'Connora and Kuylerb (2009) studied impact of land use on the biodiversity integrity of the moist sub-biome of the grassland biome in South Africa.

The decision process with AHP is simple. To divide the structure of the problem into layers including goal, criteria, subcriteria, and alternatives, respectively, and then analyze for the best option by comparing the selection criteria, pairwise options, for an easier decision which criteria is more important by giving points based on importance or preference. After scoring to prioritize the criteria, then consider analyzing each option according to the criteria set by each criterion until all criteria If the rating of importance or preference is reasonable (consistency), you can rank alternatives to find the best option.



Source: From the study

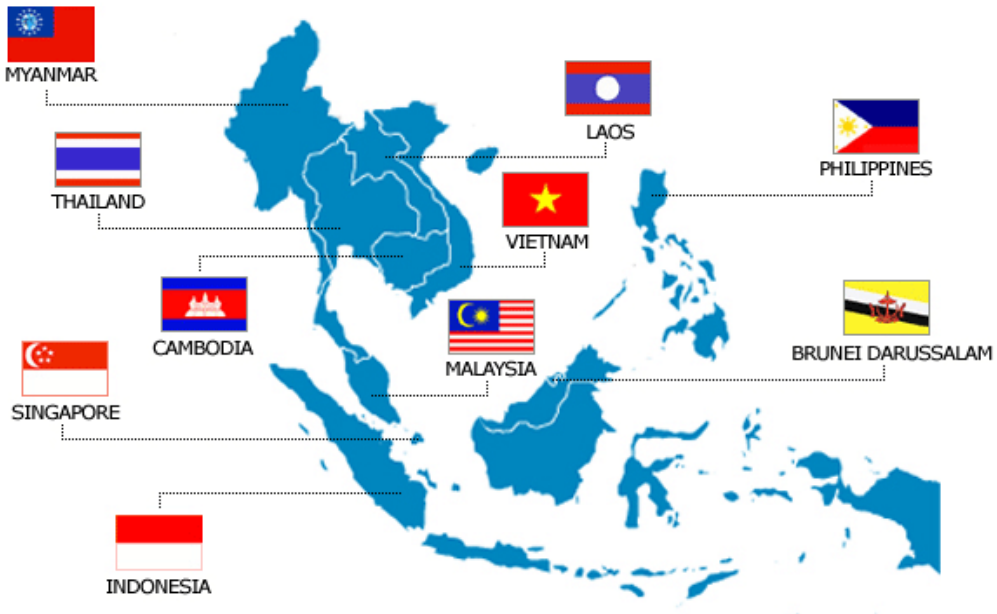
Figure 3.4 Hierarchical Structure Containing Criteria and Alternatives for an Identification of Impact of ASEAN Economic Community (AEC) on Oil Palm Producers in Thailand

CHAPTER 4

ASEAN ECONOMIC COMMUNITY (AEC)

4.1 The ASEAN Economic Community

ASEAN Economic Community or AEC has developed from the Association of Southeast Asian Nations: ASEAN, which has established by the Bangkok Declaration on August 8, 1967. The first five ASEAN leaders countries are Indonesia, Malaysia, Philippines, Singapore, and Thailand, have signed together in 2 relevant documents, namely "The Declaration of ASEAN" and "the Treaty of Amity and Cooperation in Southeast Asia," which identifies multiple economic cooperation for further action. Later in 1998-1997, ASEAN has expanded the cooperation concerning economic integration in a more accurate manner. The most important agreement is the establishment of the "ASEAN Free Trade Area (AFTA)," in 1987, Brunei became one of the members, followed by Vietnam in 1995, Laos and Myanmar in 1997, and the last member was Cambodia in 1999. At Kuala Lumpur Summit in December 1997, the ASEAN Leaders decided to transform ASEAN into a stable and highly competitive region with economic development and reduced poverty and socio-economic disparities (ASEAN Vision 2020).



Source: Morocco World News, 2018.

Figure 4.1 Countries member of the ASEAN Economic Community

A significant turning point for the establishment of the AEC occurred between 1998-2011 due to the severe global economic recession, making ASEAN needs clear economic plans in order to strengthen and increase competition capacity. ASEAN leaders have agreed to the Hanoi Plan of Action in 1998 to be used as an action plan to achieve the ASEAN vision, combined with globalization, technological advancement, and the delay in WTO multilateral negotiations, causing ASEAN to enter into negotiations to establish a free trade area with countries both inside and outside the region. In addition, China and India have played a significant role in the region during the past 3-5 years, which considered an essential economic attraction when compared to each ASEAN country, which has a very small economy. It is one of the reasons that ASEAN must accelerate the internal integration to strengthen the member countries to lead the ASEAN Economic Community (AEC) similar to the European Economic Community (EEC). The ASEAN leaders, at that time, have announced that the group integration should be completed within the year 2020, according to the second Bali Statement (Bali Concord II) on October 7, 2003, to establish an ASEAN Community consisting of 3 pillars (Association of Southeast Asia Nation, 2008):

1) The ASEAN Economic Community (AEC)
2) The ASEAN Socio-Cultural Community (ASCC)
3) The ASEAN Political-Security Community (APSC)

The motto of ASEAN is “One Vision, One Identity, One Community.”

The AEC is the realization of the end goal of economic integration in the ASEAN Vision 2020, which will establish ASEAN as a single market and production base making ASEAN more dynamic and competitive.

In 2007, ASEAN Straining the goal to establish the AEC faster from the original goal set in the year 2020 to the year 2015 in order to be able to change the global economic situation and sign the name for the rules and regulations with “The ASEAN Economic Community Blueprint” which will be a plan for implementation of the relevant cases to lead to the establishment of the AEC in November 2007. Now ASEAN becomes the most significant economic integration in South East Asia, which has a population of around 500 million people (Department of Foreign Trade, 2011).

ASEAN has created the AEC Blueprint in order to establish commitment between the member states by having an integrated economic plan to give an overview of the AEC, which consists of various economic directions and plans with a definite time frame for implementing various measures until achieving the goal in 2015 (Association of Southeast Asia Nation, 2008).

In order to create a commitment between ASEAN member countries, ASEAN has established the important strategies for advancing to the AEC as follows:

1. Single Market and Production Base

Being the same market and production base is an important strategy of the establishment of the AEC, which will make ASEAN more competitive, with ASEAN establishing new mechanisms and measures that will enhance the efficiency of the implementation of economic measures that were already

Being the same market and production base in ASEAN has five main components which are (1) Free Flow of Goods, (2) Free Flow of Services, (3) Free Flow of Investment, (4) Free Flow of Capital, and (5) Free Flow of Skilled Labor.

2. Competitive Economic Region

The fundamental goal of the ASEAN economic integration is to create a region that is highly competitive, prosperous, and economically stable. There are six main components which are (1) competition policy, (2) consumer protection, (3) intellectual property rights (IPR), (4) infrastructure development, (5) tax measures, and (6) electronic commerce.

3. Equitable Economic Development

An equitable economic development has two components: (1) Small and Medium Enterprise Development (SME) and (2) Initiatives for ASEAN Integration (IAI). The initiative aims to bridge the development gap at the SME level and strengthen the integration of Cambodia, Lao PDR, Myanmar, and Vietnam so that they can fulfill their obligations and strengthen the competitiveness of ASEAN and for all ASEAN Member States to benefit from economic integration.

4. Integration into the Global Economy

ASEAN is in the midst of an interconnected and highly networked world with interdisciplinary markets and world-class industries. Therefore, in order for the ASEAN business sector to be able to compete in the international market, making ASEAN more dynamic and being a world-class manufacturer, as well as allowing the internal market to maintain the attractiveness of foreign investment, ASEAN must focus outside the region. ASEAN integrates with the global economy by implementing two measures: (1) establishing a free trade area (FTA) and close economic partnership (CEP) with countries outside ASEAN and (2) participation in the global supply chain network.

As for the opening of free trade in palm oil products under the ASEAN framework, even though Thailand has gradually reduced the import duty on palm oil products for ASEAN member countries to 0 percent since January 1, 2010, but nowadays, the import of palm oil still of Thailand still requires import license, and it will just allow importing as appropriate for the situation only. However, entering into the AEC in 2015, ASEAN member countries, including Thailand, must gradually reduce or cancel non-tariff protection measures in order to allow goods and services to move freely inside the region, this obligation would affect Thai's agriculture more or less.

4.2 Thailand's Potential in ASEAN

The information from the Office of the ASEAN Economic Community (2011) states that Thailand has geographical strengths, which are located in the heart of Southeast Asia, giving Thailand an advantage over other countries in connection with trade, land transport with neighboring countries, and on the occasion that Thailand is working with other 9 countries in the region. In establishing the AEC, what is the potential of Thailand in achieving its goals, and what is the potential of Thailand in ASEAN?

Thailand is the third-largest country in ASEAN, with an area of 510,890 square kilometers, after Indonesia (1,811,570 square kilometers) and Myanmar (653,080 square kilometers), respectively. Regarding the Thai population, there are around 70 million people, the fourth largest in ASEAN, after Indonesia (267.66 million), Philippines (106.65 million), and Vietnam (95.54 million), respectively. Thailand's economy has the power of economic growth or mass products, total GDP 505 billion US dollars, is the second-largest in ASEAN, after Indonesia (1,042 billion US dollars). In terms of GDP per capita, Thailand displays 7,273.6 US dollars per year, the fourth-largest in ASEAN, after Singapore (64,581.9 USD per year), Brunei (31,627.7 USD per year) and Malaysia (11,239 USD per year), if look at the unemployment rate, found that Thailand has the lowest unemployment rate in ASEAN countries with 0.5 percent (World Bank, 2019).

From Table 4.1, it can be seen that Thailand has top potential in ASEAN when comparing with all ASEAN countries. From the information of the Association of Southeast Asian Nations (2019) stated that the total population of all ASEAN states amounted to an estimated 647.45 million inhabitants, while Thailand has around 70 million people. The estimated total GDP of all ASEAN states amounted to approximately 2,920 billion U.S. dollars or 3.6 percent of the world's GDP (World Population Review, 2019), while Thailand has 505 billion U.S. dollars or around 0.63 percent of world's GDP.

Table 4.1 Total area, population, GDP, GDP per capita, and the unemployment rate in ASEAN countries in 2018.

Country	Area (square kilometers)	Population (Million)	GDP (million US$)	GDP per capita (US$)	Unemployment rate (percent)
Brunei	5,270	0.43	13,567.10	31,627.7	9.3
Cambodia	176,520	16.25	24,571.75	1,512.1	0.7
Indonesia	1,811,570	267.66	1,042,173.30	3,893.6	4.5
Laos	230,800	7.06	18,130.72	2,567.5	9.4
Malaysia	328,550	31.53	354,348.42	11,239.0	3.3
Myanmar	653,080	53.71	71,214.80	1,326.0	0.9
Philippines	298,170	106.65	330,910.34	3,102.7	2.3
Singapore	709	5.64	364,156.66	64,581.9	4.2
Thailand	510,890	69.43	504,992.76	7,273.6	0.5
Vietnam	310,070	95.54	244,948.45	2,563.8	2.1

Source: World Bank, 2019.

Table 4.2 List of export-import goods and services between Thailand and ASEAN countries in 2018

List	Export value (Million THB)	List of import goods and services	Import value (Million THB)
1. Agricultural products (Agriculture, livestock, fishery)	152,205.9	1. Fuel products	378,499.2
- Palm oil	318.9		
2. Agricultural industrial products	210,366.6	2. Capital goods	334,396.2
- Oil palm	4,721.1		
3. Industrial products	1,570,779.0	3. Raw and semi-finished goods	472,093.4
4. Mineral and fuel products	265,197.3	4. Consumer Goods	193,921.6
		5. Vehicles and transportation equipment	90,341.2
		6. Weapons, consumables and other goods	489.7
Total export	**2,198,548.8**	**Total import**	**1,469,747.6**

Source: Ministry of Commerce, 2019.

And when considering the export of Thai products to ASEAN with other regions of the world in 2018, found that Thailand exports goods and services to ASEAN ranked first (27.71 percent), followed by China (12 percent), United States (11.09 percent), the European Union (9.90 percent) and Japan (9.86 percent), respectively (Table 4.3).

Table 4.3 Thailand's export destination

Export destination	Export value (Million THB)	Percent
World	8,108,299.77	100
ASEAN	2,198,548.75	27.11
European Union	802,382.21	9.90
USA	899,154.14	11.09
China	971,436.98	12.00
Japan	799,342.79	9.86

Source: Ministry of Commerce, 2019.

As for Thailand's competitiveness, the World Economic Forum (2012) conducted a study and conducted a Global Competitiveness Report 2011-2012, which states that Thailand is ranked fourth in ASEAN, after Singapore, Malaysia, and Brunei. By saying that Thailand has the advantage of being able to export, has One Stop Export Service Center (OSEC) which is located at the Department of Export Promotion, Ministry of Commerce, which is an organization established to facilitate the exporters to issue the certificate and the license used to export both the public and private sectors at the same place, allowing to reduce the process of duplicate document formalities. To enhance the competitiveness of exports for Thai entrepreneurs. There are 16 agencies in public and private sectors in this center, also have a transportation system that is a better operational factor than Indonesia, Vietnam, Philippines, and Cambodia. Innovation factors and economic expertise in Thailand are better than in Brunei but less than Indonesia.

Therefore, the potential of Thailand in ASEAN in various fields, reflecting that Thailand has the potential at the top of ASEAN countries, to be able to use the potential to develop "Thainess" to stand out if improvement of weaknesses and create the quality of personnel through the education system, or training to create a creative economy to bring Thailand's strengths in

terms of culture, outstanding Thai characteristics, and where existing social capital can be a selling point in addition to industrial development and agricultural industrial.

The Ministry of Agriculture and Cooperatives (2013) has studied the opportunity of Thai agricultural products on the AEC, in order to study the situation of production, marketing, and competitiveness of Thai agricultural products by using the TCM (Thailand Competitiveness Matrix) method in 3 product groups consisting of (1) Crops (2) Livestock products and (3) Fishery products. The results of the study show that the competitiveness of Thai agricultural products in the AEC is still promising due to being accepted in quality and standards, especially fruit, while some products have developed into the world-class competition, namely chicken and meat products.

The critical problems and obstacles are the high cost of production, especially seedlings and animals breeder, chemical, fertilizer, and pesticides. Besides, they are also experiencing low productivity and high labor costs. Most farmers and producers want to increase production efficiency by reducing production costs, using appropriate production factors such as using fertilizer to suit the soil conditions, and using agricultural machinery to replace labor. In addition, farmers also pay more attention to the use of government research and development as well as the need for the government to help reduce import duties on production factors.

The Ministry of Agriculture and Cooperatives has proposed ways to develop agricultural products by (1) maintaining the level of competitiveness of products that are in the market-leading position, such as sugarcane, mangosteen, longan, pigs, dairy cows, and beef cattle, (2) develop the potential by increasing the competitiveness of the products that are not in the market-leading position to be in a better position, such as rice, cassava, palm oil, maize, coffee, shrimp, tilapia, chicken, eggs, mango and durian, and (3) maintain the existing market base and expand new markets, especially for livestock products.

Furthermore, the Bureau of Agricultural Economics Research (2016) has analyzed the comparative advantages and market position of Thailand’s palm oil exports compared to Indonesia and Malaysia, the world's largest producers and exporters of palm oil and in the ASEAN market. During the ten years (2004-2013), both in the world market and the ASEAN market. Found that Thailand has no comparative advantage of exporting palm oil since Thailand mainly produces palm oil for domestic use (80 percent and the rest being exported.

In addition, the cost of oil palm production in Thailand is higher when compared to both countries.

Regarding analyzing the market position of palm oil products in the world market, it found that during 2004-2008, Malaysian palm oil products were in the position of the stars with high sales growth rates and has the highest market share. In this period, Indonesia, the world's number one palm oil producer country, focuses mainly on domestic consumption. However, during 2009-2013, Indonesia's palm oil products were in the position of cash cows, showing that Indonesia was able to produce more than domestic demand and had the highest market share of palm oil in the world market, but the sales growth rate is lower than the market demand. While Thailand has palm oil products in both periods (2004-2008 and 2009-2013) in question marks position, it shows that palm oil exports of Thailand in the world market is at a high sales growth rate but low market share, since Thailand uses palm oil for biodiesel production for domestic use, increased from 370,776 tons in 2009 to 772,043 tons in 2013.

Analyzing the market position of palm oil products in the ASEAN market, it found that during 2004-2013, Indonesia has the highest market share of palm oil in the ASEAN market. Therefore, Indonesia's palm oil products in 2004-2008 are in the position of the stars, and 2009-2013 is in the cash cows position, due to Indonesia's palm oil exports in the ASEAN market tends to decrease. While palm oil products of Thailand in 10 years (2004-2013) are in the question marks position, the same position with the world market. That is because Indonesia and Malaysia are major producing and exporting countries of palm oil in both the global and ASEAN markets and have a combined market share of more than 85 percent, while Thailand has only 1.30 percent (Bureau of Agricultural Economics Research, 2016).

Table 4.4 shows that in 2013, Indonesia has the highest area of oil palm at 46.81 million Rais, yield 168.48 million tons, followed by Malaysia 28.29 million Rais, yield 95.73 million tons, and Thailand 3.77 million Rais, yield 12.17 million tons, respectively. Considering production efficiency, Malaysia has the highest yield per Rai of 3,384 kilograms per Rai, followed by Thai, 3,285 kilograms per Rai, and Indonesia 3,240 kilograms per Rai, respectively. When extracted into crude palm oil, Malaysia can extract palm oil up to 20.07 percent, followed by Indonesia 20 percent and Thailand 17.54 percent, which shows that the production efficiency of palm oil in Thailand is still much lower than Malaysia and Indonesia, causing the cost of production per unit of Thailand in comparison is higher than Malaysia and Indonesia, and will directly affect the ability of palm oil export. When looking at domestic demand, Indonesia has the

highest demand for crude palm oil 8.50 million tons because Indonesia has increased the use of palm oil in the country, especially the use of palm oil for biodiesel production.

Table 4.4 Comparison of potential in oil palm and palm oil production and marketing between Indonesia, Malaysia, and Thailand in 2013

List	Indonesia	Malaysia	Thailand
1. Production			
1.1 Cultivating Area (million Rais)	46.81	28.29	3.77
1.2 Holding area for oil palm plantation of small-scale farmers (percent)	42.00	14.00	78.00
1.3 Oil palm fresh fruit brunch (million tons)	168.48	95.73	12.17
1.4 Crude palm oil (million tons)	26.9	19.22	2.14
1.5 Production capacity			
- Number of oil palm extraction plants	608	436	145
- Number of palm oil refinery plants	94	56	14
- Number of biodiesel plants	26	20	14
- Production capacity of the oil palm mill (million tons / year)	246.28	105.18	22.79
- Production capacity of palm oil refinery (Million tons / year)	NA.	26.15	2.38
- Number of oil palm breeding centers	NA.	700	161
1.6 Production efficiency			
- Oil palm fresh fruit brunch (kg / Rai)	3,240	3,384	3,285
- Crude palm oil (kg / Rai)	574.60	679.31	566.31
- Oil rate (percent)	20.00	20.07	17.54
- The actual production capacity of the oil palm mill (percent)	NA.	91.19	54.85
- The actual production capacity of the palm oil refinery (percent)	NA.	69.69	41.95
- Number of crude palm oil extraction plants per harvested area (plant / Rai)	76,990	64,885	26,000
2. Marketing			
2.1 Domestic demand (million tons of CPO)	8.50	3.20	1.73
2.2 Export volume (Million Ton CPO)	22.22	18.15	0.57
2.3 Oil palm fresh fruit brunch prices (THB / kg)	5. 0	4.82	3.54
2.4 Crude palm oil prices (THB / kg)	27.65	23.71	25.24
2.5 Palm oil price (THB / kg)	32.13	24.9 3	28.03

Source: Bureau of Agricultural Economics Research, 2016.

4.3 Oil Palm Policy under the ASEAN Economic Community Framework

The strengths that made Indonesia and Malaysia become leaders in oil palm production is the clarity of the government policy that seriously places importance on the oil palm industry. Indonesia has promoted palm oil as the leading vegetable oil for consumption in the country. Malaysia, the government has a policy that supports the manufacturing sector, seriously focus on transformation and marketing. There is an organization that regulates the palm oil industry in the country, namely Malaysia Palm Oil Board (MPOB). While the oil palm industry strategic plan in Thailand has three main objectives which are:

1) Increase palm oil production for more sufficient to enable the processing industry to add more value to the product in order to increase revenue and competitiveness.

2) Build sustainable capacity for the production and export of palm oil and products on a global level.

3) Strengthen the integrated agricultural and industrial institutions, including funding for physical development, incubation in business operations, human resource development, research, and information.

Table 4.5 Comparison of oil palm policies among the three leading countries in oil palm production in ASEAN

Policies	**Thailand**	**Indonesia**	**Malaysia**
1. Increase the quality and quantity of productivity	- Expand oil palm plantation areas in suitable areas, planting oil palm according to the announcement of the Ministry of Agriculture and Cooperatives - Increase the production of fresh bunches of palm fruit with sufficient quality to enter the processing factory - Increase the efficiency of the processing of palm oil and products into the zero-waste industry - Support the integration of both horizontal and vertical for complete business operation and create an economy of scale - Support the research and development of oil palm and on high-value products, such as vitamin E and carotenoids	- Support research and development of quality palm seedlings for the higher yields and larger amounts of oil - Financial and education support, especially for small-scale farmers - Establishment of a research center for oil palm and palm oil	- Expand oil palm plantation areas and replacing old palm trees with better palm species in order to get a higher yield - Encourage small-scale farmers to join together to increase production efficiency (RSPO group or best practice group) - Increase the efficiency of labor by requiring research and technology or machinery to replace human labor for small-scale farmers - Increasing production efficiency and searching for higher-yielding palm varieties that are consistent with future demand
2. Increase marketing effectiveness	- Create a market system that benefits all parties involved	- Infrastructure development, such as road quality, railway, and the harbors' services	- Expanding new markets and maintaining existing markets

Policies	Thailand	Indonesia	Malaysia
	- The government supports physical infrastructure - Promote the market to support both domestic and international level	- Promote and support foreigners to invest in the oil palm and palm oil industry, including establishing promotion zones - Implementing tax measures as a mechanism to drive exports, with the export tax rate adjusted in accordance with the production and marketing situation both domestically and internationally	
3. Use renewable energy	- Expand oil palm plantations and reduce biodiesel production costs - Regulatory measures, including measures to stimulate investment in biodiesel production	- Establish a pilot plant for biodiesel - Increase the proportion of biodiesel use from B7.5 to B10, and there are targets for biodiesel use in the automotive, mining, and power plant industries.	- Develop and support the use of materials from oil palm to use as biomass energy
4. Industrial management	- Establish a specialized organization under government supervision - Establish an oil palm research and development institute (one-stop service)	- The government controls the amount of palm oil domestic production and supervises the production to be sufficient for the continuous industrialization in the country. Also, there is a department	- Increase the number of standardized extraction plants that certified by MPOB - Promote the use of biological systems (Biogass) in palm oil mills in 10 factories per year

Policies	Thailand	Indonesia	Malaysia
	- Establish a complete oil palm industry center	to check the quality of the oil produced. - Establish the institutions with research and development in the oil palm and palm oil industry, such as Indonesia Oil Palm Research Institutes (IOPRI).	- Promote and support funds for the palm oil industry to create new and high-value products. - Promote and support funds for the palm oil industry to produce food and health products - Giving importance to the Oleochemical industry from palm oil and trying to develop production processes in the style of "Zero-Waste Industry."

Source: (1) Department of Internal Trade, 2011.

(2) Research Development and Innovation for Industry Institute, 2014.

(3) Malaysian Palm Oil Board (MPOB), 2019.

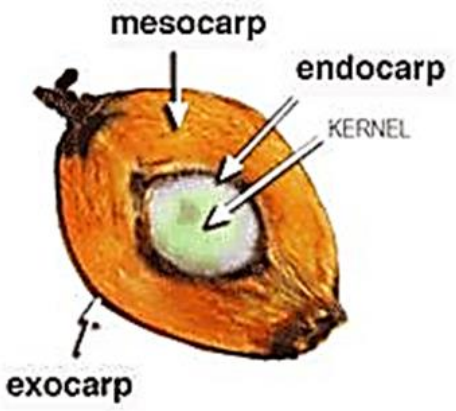
CHAPTER 5

OIL PALM

Oil palm is a plant with the highest oil production potential per unit compared to other oil crops. In the production of oil palm, which is a perennial plant, it has more resistant to the effects of natural disasters than short-lived plants. For a single investment, it can cultivate products for more than 25 years. Thailand is in a climate that is very suitable for oil palm and has an opportunity to expand the planting area, especially in the idle land, deserted area, or wilderness area. Furthermore, when planting for a long time, oil palm will help to restore nature and ecological and is a plant that is safe for consumers because there is no genetic modification, and palm oil can use for biodiesel instead of fuel as alternative energy.

5.1 The General Knowledge of Oil Palm

Palm oil (from mesocarp part) and palm kernel oil, as based ingredients are found in approximately 50 percent of products in the world, including food and non-food items. The usage of palm oil in food industry is around 67.97 percent of overall, such as snack and dessert for 9.37 percent, instant noodle for 6.40 percent, sweetened condensed milk for 4.81 percent, non-dairy creamer for margarine and shortening for 1 percent, for non-food industrial such as soap for 10.13 percent, and another items for 8.29 percent (plastic, cosmetics, engine oil, and tire) (Department of Agriculture Extension, 2016)



Source: Food Network Solution, 2018.

Figure 5.1 Structure and composition of oil palm

Oil palm is the crop that has the highest yield production (oil) compare to other oil crops in the same size of the production area and also has the lowest production cost, 10-11.50 THB/kg. Oil palm can produce palm oil (mesocarp) around 512 kg/Rai and palm kernel oil 73 kg/Rai, while rapeseed can produce oil for 89 kg/Rai and coconut for 54 kg/Rai, as shown in table 5.1.

Table 5.1 Oil production from different crops (kg/rai)

Type of crop	Oil production (kg/Rai)
Palm oil (mesocarp)	512
Palm kernel oil	73
Rapeseed	89
Sunflower	81
Coconut	54
Soybean	52
Peanut	51

Source: CPI Agrotech, 2017.

Oil palm is in Palmae or Recaceae family, has sub-family as same as coconut “Cocoideac," which has three types, including (1) Elaeis guineensis (African oil palm), (2) Elaeis oleifera (South American oil palm), and (3) Elaeis Adora (American oil palm). From those three types of oil palm, the Elaeis guineensis is the most important for economic growth (Chotisakul et. all, 1998).

Source: From the study

Figure 5.2 Re-planting oil palm in the same area that used to plant oil palm before

Oil palm is a native crop from Africa. It is a perennial and monocotyledon plant, with longevity for over 100 years, but to grow for economic will be until aged 25-30 years, they will be abandoned because the return revenue is not worthy of investing anymore, the farmer will re-planting again.

Phraya Pradipat Phu Ban brought the oil palm to plant in Thailand for the first time in 1929, by planting an ornamental plant at the Kho Hong Rubber Experiment Station, Songkhla Province, and at the Agricultural Station, Chantaburi province.

Source: Siamhistory, 2013.

Figure 5.3 Phraya Pradipat Phu Ban

Oil palm began to promote as the real plantation in the year 1968 at the Southern Developing Self-Help Land Settlement, Satun Province in area of about 20,000 rai, then the oil palm plantation area has increased steadily, until the year 2005, Thailand has a total of 2.74 million rai of oil palm plantation area and 5.03 million ton of fresh palm bunches (Department of Agriculture, 2005).

Source: From the study

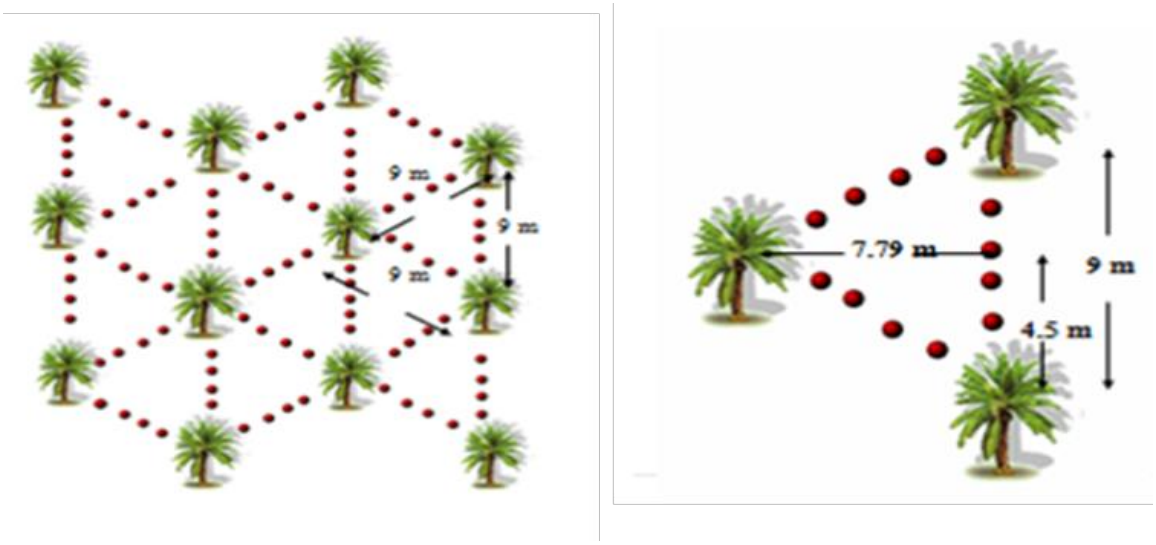
Figure 5.4 Oil palm planting area

Good practice of oil palm planting should be chosen for a suitable area, have to choose a good variety of oil palm, have proper maintenance. The important thing in choosing an oil palm plantation area is to consider the climate, land conditions, soil characteristics, and including transportation. The optimum temperature for oil palm cultivation is in the range of 20-30 degrees Celsius, sunlight at least 5 hours a day, and the relative humidity in the air at least 75 percent in the year, with a constant distribution of rainwater about 1,800-2,000 millimeters per year. Must not have a drought condition for more than three months, and should not have a severe storm.

Source: From the study

Figure 5.5 Oil palm planting area

The suitable soil condition for oil palm plantation is clay loam. It should have a depth of more than 75 centimeters of the first soil layer and can absorb well water. The groundwater level is 75-100 centimeters deep, with high nutrient and pH around 4.0-6.0, not more than 500 meters higher than sea level, with a slope, not more than 12 percent, the area without flooding and should have drainage.



Source: CPI Agrotech, 2017.

Figure 5.6 The optimal planting distance of oil palm

Source: From the study

Figure 5.7 Oil palm cultivation

The transportation of raw oil palm bunches to factories or palm oil mill is very important due to the need to send oil palm bunches into the palm oil extraction quickly (should not exceed 24 hours), therefore, oil palm plantations should be planted away from the factory not more than 120 kilometers and have a convenient transportation.

Source: From the study

Figure 5.8 Oil palm transportation

Oil palm has more than hundreds of varieties or species, but almost all of the oil palm varieties that are popular now generally are hybrid species. In Thailand, now we have three species of oil palm that are very popular, including:

1. DURA species. This species is commonly used as oil palm breeds (mother species) such as Deli Dura species, Dumpy Dura mother species, and African Dura mother species. There are some observation points such as, has a thickness of endocarp around 2-8 mm, does not have a black dotted band around the endocarp, a layer of outer shell or monocarp thickness around 30-60 percent of the palm fruit (thin mesocarp), palm fruit gives a low oil percentage, less oil from the mesocarp.

Source: CPI Agrotech, 2017.

Figure 5.9 Oil Palm DURA Species

2. PISIFERA species. This species is very popularly of being used as oil palm breeds as well, such as AVROS father species, La Me father species, Ekona father species, and Yangambi father species. There are some observation points, such as, does not have endocarp, has a very thick mesocarp, small bunches, palm fruits are often atrophy because this species in female inflorescences is usually sterile, each tree has very low yield or no yield at all, has very high oil percentage per palm fruit, has large palm tree, not popular for economy growing, only for breeding.

Source: CPI Agrotech, 2017.

Figure 5.10 Oil Palm PISIFERA Species

3. TENERA species. This species is a hybrid between DURA and PISIFERA. Almost all of the plantation is for commercial. There are some observation points, such as, has a thickness of endocarp around 0.5 - 4 mm, has a black dotted line around the endocarp, a layer of the outer shell, or monocarp thickness around 60-90 percent of the palm fruit, and provides consistent yield.

Source: CPI Agrotech, 2017.

Figure 5.11 Oil Palm TENERA Species

5.2 Palm Oil Industry System in Thailand

Besides export, Thailand is also a major country that imports crude palm oil, which is significantly increasing every year. In 2012, the value of crude palm oil imports up to 1,1120 million THB. It is fascinating that a small country like Thailand also has high energy consumption. Then how about the bigger countries with large industries? How much energy do they need to use?

Generally, Thailand has campaign to save energy consumption continuously, especially the fossil fuel. Finding renewable energy is also one of the strategies in order to reduce the amount of crude palm oil imports. The target is to have alternative energy and alternative energy development plan at least 25 percent in 10 years (2012-2021) such as solar energy, wind energy, water energy, bioenergy, and biofuels. For biofuels, to produce new fuels replaces diesel in the future for 25 million liters per day, ethanol for 9 million liters per day, and Biodiesel B10 for 5.97 million liters per day, focusing on the development of two aspects plan (Department of Agriculture, 2019):

1. Supply-side: Promoting the cultivation of oil palm trees in suitable areas without food crops competition by

    (1) Promoting a palm planting area of 5.5 million Rais and having a total of 5.3 million Rais of palm oil by the year 2021.
    (2) Increase the power to produce crude palm oil not less than 3.05 million tons per year.
    (3) Encourage the production target or yield not less than 3.2 tons per Rai per year with oil content ratio, not less than 18 percent.

2. Demand-side

    (1) Manage the mixing ratio of biodiesel by the amount of palm oil production in the country.
    (2) Try piloting B10 or B20 in the fleet of trucks or specific fishing boats.
    (3) Prepare to develop standard biodiesel with Fatty Acid Methyl Ester: FAME (a type of biodiesel that has almost the same properties as regular diesel oil but less pollutant) to be able to mix 7 percent of diesel fuel (B7).

The development plan is including comprehensive management from oil palm planting, oil extraction, production of edible oil, consumption of biodiesel, and continuing industries, import, export, as well as research and development to reduce costs and create added value for the country.

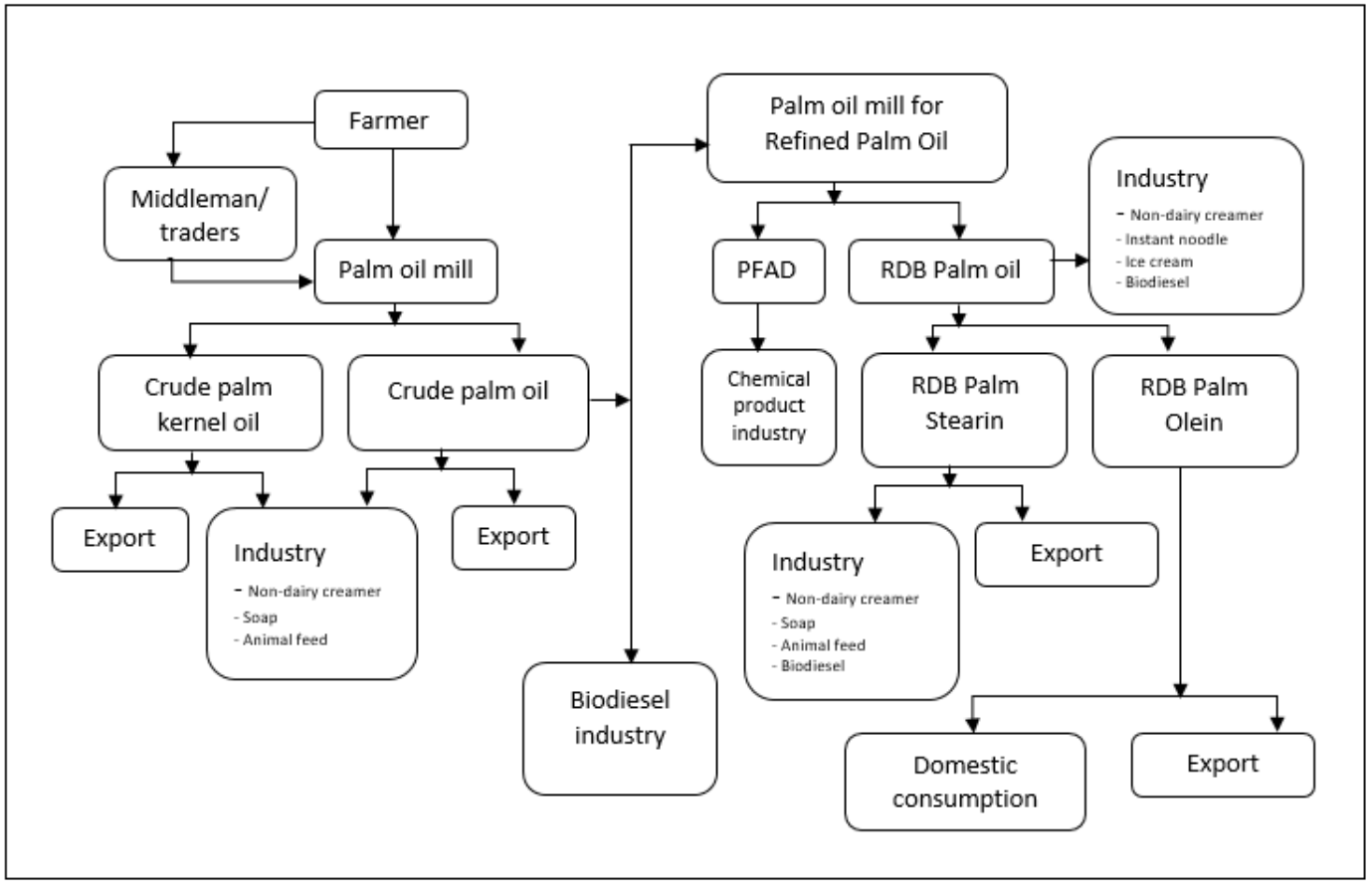
Source: Henan DOING Mechanical Equipment Co., Ltd. 2015.

Figure 5.12 The difference between palm oil and palm kernel oil

Figure 5.13 shows the palm oil industry system in Thailand. Start from farmer or producer sends the product to middleman or trader to collect and to gather oil palm before to pass it through palm oil mill (factory), or the farmers can sell their product to palm oil mill directly. Palm oil mill will put oil palm in process and will get two types of oil, which are crude palm kernel oil (from the kernel) and crude palm oil (from mesocarp)

Both crude palm kernel oil and crude palm oil can use a factor of production in another industry, such as non-dairy creamer, soap, and animal feed. Furthermore, crude palm oil can also be used as factor of production in biodiesel industry, or if take it to pass more process to be refined palm oil which will get PFAD (Palm Fatty Acid Distillate) to use in chemical product industry, and RDB - Refined Bleached Deodorized Palm oil to use as a factor of production in many industries, such as non-dairy creamer, instant noodle, ice cream, or even biodiesel.

RDB Palm oil can be processing and transform to RDB Palm Stearin and RDB Palm Olein, Thailand exports both to another country. RDB Palm Stearin can be used for the Non-dairy creamer industry as well, soap, animal feed, or to produce biodiesel with RDB Palm Olein.



Source: The Office of Agricultural Products Trade Promotion, 2014.

Figure 5.13 Palm oil industry system in Thailand

Oil palm can be processed into various industrial products to be used for many purposes such as:

1. CPO Crude Palm Oil: a product obtained from the Fresh Fruit Bunch process in order to obtain crude palm oil, with a thick texture and have opaque orange color at an average temperature. Crude Palm Oil generally used as a raw material in the palm oil refining process in order to obtain other continuous products.

2. KO Crude Palm Kernel Oil: a product obtained from the extraction of kernel seeds, has semi-liquid texture, yellow to brown color at an average temperature. Crude Palm Kernel Oil generally used as a raw material in the palm oil refining process in order to obtain other continuous products as well as Crude Palm Oil.

3. RKO RBD Palm Kernel Oil: a product obtained from the distillation of palm kernel oil (KO) to be pure palm kernel oil, has semi-liquid texture, and light-yellow color at an average temperature. Typically RBD Palm Kernel Oil can be used as a raw material in the soap industry or food industry such as sweetened condensed milk, butter, and ice cream.

4. RPO RBD Palm Oil: a product derived from crude palm oil refining (CPO) to be pure palm oil, has semi-liquid texture and light-yellow color at an average temperature. RBD Palm Oil can be used as raw materials in the food industry, such as the production of instant noodles, margarine, ice cream, condensed milk, and soap.

5. ROL RBD Palm Oil: a product obtained from the separation of wax pure palm oil from pure palm oil (RPO) in order to obtain palm olein oil with a clear yellow appearance at an average temperature and without impurities. ROL RBD Palm Oil can be used as raw materials in all types of fried food-related industries, such as snacks, ready-to-eat food, including household cooking.

6. PHST RBD Palm Stearin: a product obtained from the separation of wax pure palm oil from pure palm oil (RPO), has a solid texture and white color at an average temperature. Used as raw materials in the food industry, such as the production of margarine, white butter, pastry cream, including the oleochemicals industry.

7. PFAD Palm Fatty Acid Distillate: a product obtained after refining crude palm oil (CPO) to obtain palm fatty acids, has a solid texture with light brown color at an average temperature.

PFAD Palm Fatty Acid Distillate can be used as a raw material in the soap production industry, the Oleochemical industry, Vitamin E production, including the biodiesel production industry.

8. KFAD Palm Kernel Fatty Acid Distillate: a product obtained after refining palm kernel oil (KO) to get palm kernel fatty acids, has clear yellow at average temperatures. KFAD Palm Kernel Fatty Acid Distillate can be used as a raw material in the soap industry, the Oleochemical industry, Including the biodiesel production industry.

9. KM Kernel Meal: a product obtained after extracting oil from the kernel to obtain palm kernel meal, has fine grain texture and light brown color. KM Kernel Meal can be used as raw material in the animal feed industry, especially the big animals.

10. Oil palm leaves: in the oil palm plantation, when the leaves are cut, they can be chopped to feed cattle, cows, and horses. Oil palm leaves are a source of fiber and essential vitamin E.

5.3 The Situation of Oil Palm in the World

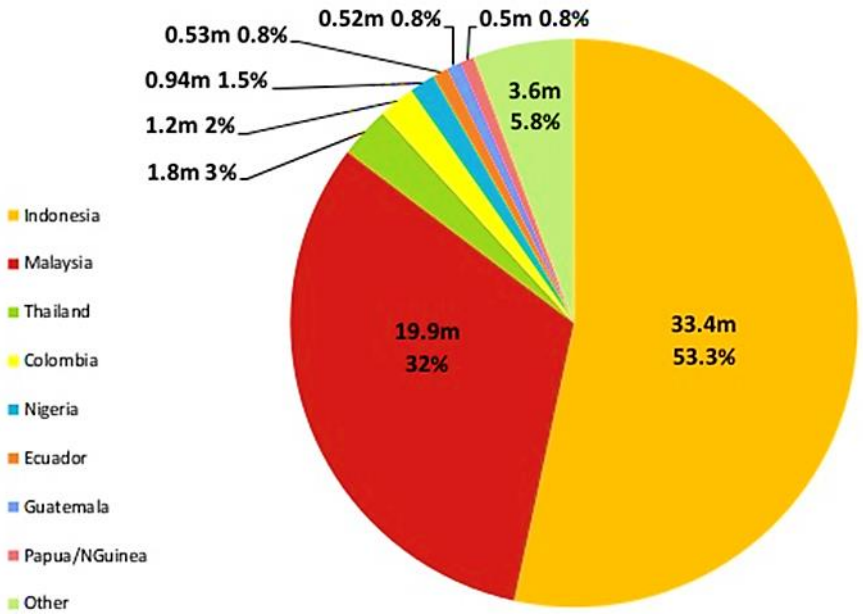
Oil palm can be planted only about 42 countries worldwide due to the area suitable for oil palm planting. Thus, making ASEAN countries, especially Malaysia and Indonesia, become the world's leading oil palm producer, Thailand is one of the countries that are suitable for oil palm cultivation as well. When considering a country that is able to produce oil palm according to the potential of producing vegetable oil, it can be separated into three groups which are:

1. Countries that produce vegetable oil and excess of domestic demand are 11 countries, but only four countries that have the potential to export vegetable oils are Malaysia, Indonesia, the United States, and Brazil.

2. The country that produces enough vegetable oil for domestic demand has 18 countries, which Thailand is one of the countries in this group.

3. Countries that produce vegetable oil are not sufficient for domestic demand, with 47 countries. Major importing countries are Russia, China, North Korea, South Korea, India, Pakistan, including Vietnam, and Cambodia.

In 2015, all countries around the world were able to produce 65 million tons of oil palm (FFB-fresh fruit bunches), and if considering both the area of production and crude palm oil production, found that about 85 percent came from the 3 countries of ASEAN, namely Indonesia, Malaysia and Thailand, and on a global scale, these 3 countries as well biggest producer followed by Colombia, Nigeria, Ecuador, Guatemala, and Papua New Guinea. While the government of CLMV countries (Cambodia, Laos, Myanmar, and Vietnam) has the policy to promote and focus on planting and producing oil palm as well. Because of the need to reduce imports in the next 5 years, it is expected that CLMV will have a total of 4-5 million Rais of oil palm plantations. Which found that Myanmar and Cambodia will have a lot of FFB production in the near future, therefore considered that "oil palm is an economic crop of ASEAN", we know well that Indonesia and Malaysia are the world's major oil palm producers, but Indonesia and Malaysia have begun to change their role as the number one and second grower of the world to be the world's number one producer and processing of palm oil, which both countries turned to develop "Oleochemical industries" such as soap, detergents, cosmetics, chemicals used in the textile industry, plastic. Those products can create more value than oil palm itself.



Source: SlideShare, 2016

Figure 5.14 Global Palm Oil Production by Country in 2015

Although Thailand is one-third of the world in oil palm production but when comparing the potential of oil palm production in Thailand with Malaysia and Indonesia, it is considered "There are still differences" in both the upstream, midstream, and downstream, for example, Indonesia has an area of 58 million Rais, Malaysia 35 million Rais, while Thailand only has 4.5 million Rais, which the world's oil palm production area is 120 million Rais. The production of oil palm and CPO (Crude Palm Oil) of Thailand is less than both countries, and the productivity per Rai of Thailand is lower than both Malaysia and Indonesia. Besides, the oil extraction and squeezing plants of Malaysia and Indonesia are larger factories with large production capacity, and there is also an oil extraction technique that is separating palm oil and palm kernel oil, which helps to get a higher rate of oil.

Analyzing the situation of neighboring countries, the major oil palm producers found that ASEAN member countries that are producing and exporting palm oil in the world market are Indonesia and Malaysia. Both countries exported together, equal to 89 percent of the total amount of palm oil in the world. The potential, weakness, and production strengths of Malaysia and Indonesia are shown in Table 5.2.

Malaysia has a smaller area, and land price is higher than Indonesia but can produce more oil palm with superior technology and government support, can export more with the same import market, which is China, India, Pakistan, and the European Union. For Thailand, though ranked third in the world palm oil producers but still considered very small compared to the two countries, due to the insufficient amount of palm oil combined with the remaining palm oil from consumption has been taken to biodiesel, causing Thai palm oil export markets to rely on Malaysian markets, with more than 66 percent of the amount of palm oil exported to Malaysia. The remaining exports are India, Gabon, and the Philippines, representing 13 percent, 8 percent, and 5 percent, respectively.

Table 5.2 Comparison of palm oil production and export in Indonesia, Malaysia, and Thailand in 2014

List	Indonesia	Malaysia	Thailand
1. Ranking of palm oil production in the world.	1	2	3
2. World's Market share (percent)	44	43	0.01
3. Crude palm oil production (million tons)	24	29	2
4. Export (million tons)	16	16	0.4
5. Strength	The lower price of land and labor	- There is a completed industry. - The government has a definite vision.	A clear policy on using biodiesel
6. Weakness	Domestic unrest	Higher the price of land and labor	High production costs, such as fuel, fertilizer, herbicides, and labor.
7. Strategy	Increase production	- Able to meet consumer demand - zero-waste	- Increase quality productivity - Increase marketing effectiveness - Use renewable energy - Industrial management
8. Primary partner countries	China, India, Pakistan, and the European Union.	China, India, Pakistan, and the European Union.	Malaysia

Source: Eksomtramage, T. 2014.

In 2009/2010-2013/2014, the world's palm oil production tends to increase by 6.66 percent per year, with 2013/2014 the production of palm oil is 59.30 million tons, increasing from 55.97 million tons in 2012/2013, by 5.95 percent due to the large producing countries such as Indonesia and Malaysia have expanded the cultivated area. Indonesia, the leading oil palm producer, can produce at 31.00 million tons, followed by Malaysia can produce 19.90 million tons. Both countries produce 90.84 percent of world palm oil production. Thailand is the third-largest in the world and can produce 2.15 million tons, equivalent to 3.63 percent of world palm oil production (USDA Foreign Agricultural Service, 2019).

Table 5.3 World palm oil account balance 2009/2010 - 2013/2014

Year	Productivity	Import	Export	Demand	Stock
2009/10	45.99	35.21	35.51	45.09	5.52
2010/11	48.84	36.49	37.46	47.14	6.28
2011/12	51.11	38.99	40.07	49.92	7.29
2012/13	55.97	41.82	43.42	54.49	7.27
2013/14	59.30	40.68	42.37	56.98	7.90
Rate of change (%)	**6.66**	**4.34**	**5.14**	**6.32**	**9.02**

Source: USDA Foreign Agricultural Service, 2015. Unit: million tons

In 2009/2010-2013/2014, the demand for palm oil in the world tends to increase by 6.32 percent per year. In 2013/2014, the demand for palm oil is 56.98 million tons, increased from 54.49 million tons in 2012/2011 or 4.57 percent, due to the increasing demand for food and renewable energy. In 2013/2014, the major palm oil consumer countries are Indonesia at 9.79 million tons, followed by India at 8.35 million tons, China at 6.38 million tons, and the European Union at 6.16 million tons, respectively (USDA Foreign Agricultural Service, 2019).

In 2009/2010 - 2013/2014, the palm oil export volume of the world tends to increase by 5.14 percent per year. Take a look at 2013/2014, the volume of exports is 42.37 million tons, decreased from 43.42 million tons in 2012/2013, by 2.42 percent, due to Indonesia and Malaysia, the major exporting countries, have increased domestic consumption. The major palm oil exporting countries are Indonesia, with 20.40 million tons and Malaysia with 17.30 million tons. Both countries have a market share of palm oil for 88.97 percent of the world's export volume (USDA Foreign Agricultural Service, 2019). The major importing countries are India with 8.00 million tons, China with 6.30 million tons, and the European Union with 6.20 million tons, respectively (USDA Foreign Agricultural Service, 2019).

5.4 The Situation of Oil Palm in ASEAN and Thailand

5.4.1 Indonesia

Table 5.4 shows that from 2009-2013, the plantation area, cultivating area, CPO productivity, CPO productivity per Rai of Indonesia tends to increase by 7.71 percent, 5.82 percent, 6.22 percent, and 0.38 percent, respectively. Found that in 2013, Sumatra Island had the largest area of oil palm plantation, followed by Kalimantan Island, Sulawesi Island, Papua Island, and Java Island, representing 62.58 percent, 32.19 percent, 3.18 percent, 1.03 percent, and 0.31 percent of the total plantation area of the country, respectively.

Table 5.4 Plantation area, cultivating area, CPO productivity, CPO productivity per Rai of Indonesia year 2009-2013

Year	Plantation Area (million Rai)	cultivating Area (million Rai)	CPO Productivity (million ton)	CPO Productivity/Rai (kg/Rai)
2009	49.68	37.75	21.39	566.61
2010	53.43	39.98	22.50	562.69
2011	56.89	42.51	24.00	564.49
2012	63.33	45.77	26.02	568.35
2013	66.17	46.81	26.90	574.60
GR (%)	**7.71**	**5.82**	**6.22**	**0.38**

Source: BPS-Statistics Indonesia, 2019.

Palm oil producers in Indonesia are divided into three groups, including private companies, small-scale farmers, and the government. In 2013, the amount of oil palm plantation area classified by a group of producers as follows: private companies 33.54 million Rais, small farmers 27.60 million Rais, and government 5.02 million Rais, representing 51 percent, 42 percent, and 7 percent, respectively. The amount of oil palm plantation area classified by crude palm oil production found that private companies 15.01 million tons, small farmers 9.5 million tons, and government 5.02 million tons (BPS-Statistics Indonesia, 2019).

According to the Ministry of Agriculture Republic of Indonesia (2014) found that the industrial structure of oil palm and palm oil in Indonesia, found that Indonesia has produced a variety of palm oil processing products and tend to increase steadily in accordance with the amount

of palm oil production, which is processed from Crude Palm Oil (CPO) and Palm Kernel Oil (PKO) into PFAD, Olein, Stearin, and Fatty Acid. Olein can be used as a base to produce vegetable oil or methyl esters, which can continue to produce biodiesel. PFAD can use to produce soap, methyl ester, and butter. Stearin can use to produce margarine, cosmetics, and soaps. The fatty acid can use for oleochemical products production. Indonesia has four types of palm oil processing plants, which are palm oil extraction plants, palm oil refinery, Olio chemical factories, and biodiesel factories.

Table 5.5 shows that during 2009-2013, the domestic demand for palm oil tends to increase by 11.68 percent, increasing from 5.43 million tons in 2009 to 8.50 million tons in 2013. Mostly palm oil in Indonesia is used for food 5.27 million tons, followed by 2.98 million tons for the industry and 0.256 million tons for the animal feed, representing 61.99 percent, 35.00 percent, and 3.01 percent of total demand.

However, the demand for industry tends to increase more. Since Indonesia has the policy to drive the production and use of biodiesel, in September 2013, the Ministry of Energy and Minerals of Indonesia has increased the proportion of biodiesel usage. Biodiesel from B7.5 to B10 and with biodiesel usage targets in the automotive, mining, and power plant industries.

Table 5.5 The amount of palm oil domestic consumption in Indonesia year 2009-2013

List	2009	2010	2011	2012	2013	GR (%)
Food	4.110	4.475	4.502	4.845	5.270	**5.94**
Industry	1.165	1.700	2.211	2.735	2.975	**26.50**
Animal Feed	0.155	0.170	0.216	0.235	0.256	**14.19**
Total	**5.430**	**6.345**	**6.929**	**7.815**	**8.501**	**11.68**

Source: USDA Foreign Agricultural Service, 2015. Unit: million tons

During the years 2009-2013, the export of crude palm oil and palm kernel oil in Indonesia tends to increase in both volume and value at 5.04 percent per year and 10.90 percent per year. In 2013, Indonesia has approximately exports of crude palm oil and palm kernel oil totaled 22.22 million tons or 17,140.44 million USD. The volume increased from 20.31 million tons in the year 2012 by 9.44 percent (Table 5.6).

Table 5.6 Export volume and value of crude palm oil and palm kernel oil in Indonesia 2009-2013

Products	Unit	2009	2010	2011	2012	2013	GR (%)
Crude palm oil	ton(s)	9,566,746	9,444,170	8,424,037	7,252,519	6,584,732	-9.62
	million USD	5,702.126	7,649.966	8,777.016	6,676.504	4,978.533	-3.99
Another crude palm oil	ton(s)	7,262,460	6,847,686	8,012,165	11,592,501	13,993,244	20.18
	million USD	4,665.495	5,819.000	8,484.232	10,925.664	10,860.317	26.11
Palm kernel oil	ton(s)	1,466,860	1,336,339	1,101,340	630,272	451,754	-26.71
	million USD	919.628	1,465.569	1,640.074	651.184	352.969	-23.86
Other palm kernel oil	ton(s)	236,404	235,947	341,326	830,102	1,192,778	56.75
	million USD	172.170	262.124	473.803	859.302	948.617	58.41
Total	**ton(s)**	**18,532,470**	**17,864,142**	**17,878,868**	**20,305,394**	**22,222,508**	**5.04**
	million USD	**11,459.419**	**15,196.659**	**19,375.125**	**19,112.654**	**17,140.436**	**10.90**

Source: BPS-Statistics Indonesia, 2019.

From table 5.6 also found that the highest palm oil export is in the form of other crude palm oil for 62.97 percent of Indonesia's total exports, followed by crude palm oil, other palm kernel oil, and palm kernel oil, representing 29.63 percent, 5.37 percent, and 2.03 percent, respectively. The major export markets of Indonesia are Asian market 59.27 percent, European market 37.68 percent, and other markets 3.05 percent. The major importing countries are including India, Netherlands, Italy, and Singapore.

Indonesia is the number one palm oil exporter in the world, resulting in very few imports. During the years 2009-2013, the imports of crude palm oil and palm kernel oil in Indonesia tends to decrease both the volume and value of 13.65 percent per year and 6.07 percent per year. However, in 2013, Indonesia has the volume of crude palm oil imports, and palm kernel oil totaled 65,887 tons, or 47 million USD, in this amount was imported in the form of other crude palm oil total of 65,561 tons, increasing of 616 tons in 2012 or 105 percent, mainly imported from Malaysia (Table 5.7).

Table 5.7 Import volume and value of crude palm oil and palm kernel oil in Indonesia 2009-2013

Products	Unit	2009	2010	2011	2012	2013	GR (%)
Crude palm oil	ton(s)	2,008	4,000	22,999	-	-	-
	million USD	1,332	3,361	24,506	-	-	-
Another crude palm oil	ton(s)	19,130	42,720	345	616	65,561	-16.27
	million USD	11,794	34,440	487	831	46,979	-9.15
Other palm kernel oil	ton(s)	1,048	1,362	1,366	640	326	-26.59
	million USD	1,560	2,208	3,284	1,216	496	-25.09
Total	**ton(s)**	**22,186**	**48,082**	**24,710**	**1,256**	**65,887**	**-13.65**
	million USD	**14,686**	**40,009**	**28,277**	**2,047**	**47,475**	**-6.07**

Source: BPS-Statistics Indonesia, 2019.

5.4.2 Malaysia

During the years 2007-2013, the oil palm plantations area and cultivating area tend to increase by 3.25 percent per year and 2.95 percent per year, respectively. In the year 2013, the total cultivating area is 28.29 million Rais, which increased from 27.21 million Rais, in 2012 or 3.97 percent (Table 5.8).

The oil palm producers in Malaysia are divided into 4 groups, including government, large private companies, small-scale farmers, and institutions under the government, which are the Federal Land Development Authority (FELDA), the Federal Land Consolidation and Rehabilitation Authority (FELCRA), and the Rubber Industry Smallholders Development Authority (RISDA). In 2013, most oil palm plantation areas belonged to private companies for approximately 62 percent, followed by institutions under the government, small-scale farmers, and government, representing 18 percent, 14 percent, and 6 percent, respectively (Table 5.9).

Table 5.8 Plantation area and cultivating area of Malaysia year 2007-2013

Year	Plantation Area (million Rai)	cultivating Area (million Rai)
2007	26.91	23.53
2008	28.05	24.47
2009	29.52	25.47
2010	30.34	26.26
2011	31.25	26.76
2012	31.73	27.21
2013	32.69	28.29
GR (%)	**3.25**	**2.95**

Source: Malaysian Palm Oil Board (MPOB), 2019.

Table 5.9 Oil palm plantation area in Malaysia year 2013 (divided by manufacturer)

Manufacturers	Plantation Area (Rai)	Percentage
Large private companies	20,265,238	62.00
Small-scale farmers	4,576,025	14.00
Government	1,961,150	6.00
Institutions under the government	5,883,456	18.00
- FELDA	4,249,163	13.00
- FELCRA	980,575	3.00
- RISDA	653,719	2.00
Total	**32,685,869**	**100.00**

Source: Malaysian Palm Oil Board (MPOB), 2019.

The extraction of palm oil for high oil yield and good quality, the fresh fruit brunch must be harvested no longer than 24 hours before being into the extraction plant for processing by sterilization, stripping, extraction, and cleaning, respectively. After that, the extracted crude palm oil will be sent into the refining process to obtain the product with the specified qualifications and types, which are divided into two methods: (1) physical method by steam and (2) chemical method or Alkali distillation method. Found that there were no significant differences in the technology of palm oil extraction and distillation in Malaysia and Thailand, only the difference in production efficiency, which causes crude palm oil yields on different levels.

Malaysia is able to produce various processed palm oil products, and they are continuously increasing. In 2013, the production of processed palm oil totaled 29.96 million tons, increasing from 26.82 in 2012 by 11.71 percent. Most of the processed palm oil is in the form of RBD Palm Oil, which is around 14.82 million tons, representing 50 percent of the total production of the processed palm oil, followed by RBD Palm Olein and RBD Palm Stearin with production volumes of 10.58 and 2.83 million tons, or representing 35 percent and 9 percent, respectively. Also found that most of the processed palm oil products from Malaysia tend to increase, which RBD Palm Oil has the highest trend, with 28 percent per year. In 2013, Malaysia can produce RBD Palm Olein at 14.82 million tons, an increase of 13.26 million tons in 2012, or around 11.76 percent.

Table 5.10 The production volume of palm oil products in Malaysia year 2009-2013

Products	2009	2010	2011	2012	2013	GR (%)
C.P. Stearin	47,673	39,073	56,863	49,753	86,733	- 2.63
C.P. Olein	276,893	198,623	244,327	207,828	274,469	9.92
RBD Palm Oil	14,750,362	14,764,330	15,205,333	13,255,277	14,817,770	28.87
RBD Palm Olein	9,938,338	10,327,581	10,998,085	9,538,403	10,577,107	1.50
RBD Palm Stearin	2,595,147	2,706,535	2,858,371	2,540,904	2,830,126	1.61
PFAD	694,651	672,940	771,774	659,083	734,269	1.01
Cooking Oil	468,693	490,740	532,304	566,352	644,396	8.89
Total	**28,771,757**	**29,199,822**	**30,667,057**	**26,817,600**	**29,964,870**	**7.92**

Source: Malaysian Palm Oil Board (MPOB), 2019.

Table 5.11 shows that Malaysian palm oil consumption tends to decrease by 0.97 percent per year during the period of 2009-2013. In 2013, Malaysia consumed 3.20 million tons of palm oil, which decreased from 3.59 million tons in 2012 by 10.86 percent. Malaysian palm oil is mostly used in the industry, on average of 63.97 percent, followed by food for consumption 28.13 percent, and the remainder is for animal feed 7.91 percent.

Table 5.11 The amount of palm oil domestic consumption in Malaysia year 2009-2013

List	2009	2010	2011	2012	2013	GR (%)
Food	0.86	0.89	0.88	0.90	0.90	**1.03**
Industry	2.28	2.39	2.38	2.49	2.05	**- 1.79**
Animal Feed	0.25	0.25	0.24	0.20	0.25	**- 1.38**
Total	**3.39**	**3.53**	**3.50**	**3.59**	**3.20**	**- 0.97**

Source: USDA Foreign Agricultural Service, 2015. Unit: million tons

Malaysia's palm oil and related products exports tend to increase in both volume and value, on average 3.37 percent per year and 3.15 percent per year, respectively. In 2013, Malaysia had a total export volume of palm oil and related products of 25.70 million tons or 613,634 million THB, which increased from 24.59 million tons in 2012 by 4.51 percent while the value of exports is decreased from 714,482 million THB in 2012 or 14.11 percent (Table 5.12).

From table 5.12 also found that the highest export of palm oil and palm oil-based products is in the form of Crude palm oil for 73.77 percent of the total exports of Malaysia, followed by Oleochemicals, palm kernel oil, finished products, palm kernel cake, biodiesel, and others, with a proportion of exports representing 15.15 percent, 5.55 percent, 2.21 percent, 2.08 percent, 0.82 percent, and 0.41 percent, respectively. The major export markets of Malaysia are the European market for 11.82 percent and the Asian market for 8.80 percent.

Table 5.12 Export volume and value of palm oil and palm oil-based products in Malaysia 2009-2013

Products	Unit	2009	2010	2011	2012	2013	GR (%)
Crude palm oil	ton(s)	15,880,744	16,664,068	17,993,265	17,575,486	18,146,823	3.48
	million THB	369,476	448,599	604,719	529,946	452,692	3.18
Palm kernel oil	ton(s)	1,117,477	1,163,586	1,176,202	1,084,618	1,170,799	1.38
	million THB	30,212	43,417	60,974	40,973	34,064	0.73
Palm Kernel Cake	ton(s)	2,381,571	2,443,383	2,227,410	2,473,732	2,668,393	2.46
	million THB	4,961	7,430	9,247	10,278	12,787	11.08
Oleoche-micals	ton(s)	2,174,667	2,203,688	2,181,430	2,601,377	2,726,930	5.55
	million THB	65,829	65,829	65,829	65,829	65,829	65,829
Finished Products	ton(s)	580,034	409,359	402,909	361,143	367,161	- 11.94
	million THB	19,132	14,648	17,171	14,947	13,563	- 10.65
Biodiesel	ton(s)	227,457	89,609	49,999	28,983	175,032	- 18.04
	million THB	6,058	2,665	1,797	984	5,026	- 17.70
Other products	ton(s)	64,898	66,343	240,456	465,686	447,568	49.32
	million THB	922	811	1,738	2,769	2,525	19.37
Total	**ton(s)**	**22,426,850**	**23,040,037**	**24,271,672**	**24,591,025**	**25,702,707**	**3.37**
	million THB	**496,590**	**597,306**	**804,114**	**714,482**	**613,634**	**3.15**

Source: Malaysian Palm Oil Board (MPOB), 2019.

In 2009-2013, found that the total volume of palm oil and related products of Malaysia is likely to increase by 8.80 percent. In 2014, the volume of import palm oil and related products was at 718,652 tons, which decreased from 1,808,442 tons in 2013 or at 60.26 percent. Besides, also found that the highest imports product is CPO at 77.34 percent, followed by palm kernel oil, and palm kernel, representing 19.54 percent and 3.12 percent, respectively (Table 5.13).

Table 5.13 Amount of imports of palm oil in Malaysia 2009-2013

Products	2009	2010	2011	2012	2013	GR (%)
Crude palm oil	930,179	1,112,169	1,305,676	1,391,483	555,776	**16.80**
Palm kernel oil	344,293	445,066	388,516	366,684	140,435	**- 2.84**
Palm kernel	21,170	36,761	38,740	50,275	22,441	**- 7.27**
Total	**1,295,642**	**1,593,996**	**1,732,932**	**1,808,442**	**718,652**	**8.80**

Source: Malaysian Palm Oil Board (MPOB), 2019.

5.4.3 Thailand

The palm oil plantation area and cultivating area in Thailand tend to increase by 4.51 percent and 4.52 percent per year, respectively. In 2013, the cultivating area was 4.09 million Rais, with yield of 13.20 million tons, and the yield per Rai was 3,223 kilograms, increased from 3.77 million Rais of cultivating area, and 12.38 million tons of productivity in 2013, representing 8.49 percent and 6.62 percent, respectively due to the oil palm planted in 2008-2010 started to produce fruit, and in addition, farmers are also expanding the plantation area continuously. While the yield per rai in 2014 has decreased to 3,223 kilograms per rai from 3,287 kilograms per rai in 2013, or around 1.95 percent (Table 5.14).

Table 5.14 Plantation area, cultivating area, CPO productivity, CPO productivity per Rai of Indonesia year 2009-2013

Year	Plantation Area (million Rai)	Cultivating Area (million Rai)	Productivity (million ton)	Productivity per Rai (kg/Rai)
2009	3.87	3.37	8.22	2,441
2010	4.09	3.57	10.76	3,018
2011	4.37	3.70	11.31	3,057
2012	4.48	3.77	12.38	3,287
2013	4.61	4.09	13.20	3,223
GR (%)	**4.51**	**4.52**	**11.49**	**6.62**

Source: Office of Agricultural Economics, 2015.

Table 5.15 shows that during 2010-2014, the demand for palm oil in Thailand tends to increase both for consumption and production of biodiesel by 3.32 percent and 26.53 percent per year, respectively. In 2014, the demand for palm oil for consumption was 927,574 tons, decreased from 957,887 tons in 2013, or 3.16 percent, and the demand for palm oil for biodiesel production was 865,692 tons, increased from 772,043 tons in 2013 by 12.13 percent, since the Ministry of Energy announced to increase the proportion of biodiesel to B7 from May 14, 2014, onwards.

The volume and value of Thai palm oil exports are likely to increase by 19.19 percent and 13.27 percent per year during 2010-2014. In 2014, the amount of palm oil exports was 445,526 tons, with value at 12,000 million THB, decreased from 725,222 tons, or 17,647 million THB in 2013, representing 38.57 percent and 32 percent, respectively. That is because, in 2013, the government supports the price of fresh fruit brunch, and in 2012-2013, the private sector has pushed exports to reduce the level of stock crude palm oil in the country, resulting in exports in 2014 has decreased if compared to the previous years. Thailand's important palm oil export markets are the ASEAN market for 53.92 percent, the EU Market for 16.41 percent, and other countries for 29.67 percent.

Thailand is able to produce enough palm oil for domestic demand, except for some years in which the climate is fluctuating and the domestic production decreases resulting in a production shortage. The National Oil Palm Policy Committee, with the approval of the Council of Ministers, will approve the import of palm oil through the Public Warehouse Organization to solve the problem.

Table 5.15 Palm oil account balance of Thailand year 2009-2013

Year	Stock (start)	Productivity	Import	Total	Export	Domestic Consumption		Stock (end)	Total
						Consump-tion	Biodesel		
2009	135,518	1,287,509	-	1,423,027	158,501	814,511	382,228	67,787	1,423,027
2010	67,787	1,832,151	59,668	1,959,606	388,940	896,463	376,617	297,586	1,959,606
2011	297,586	1,892,552	40,056	2,230,194	307,386	932,258	626,380	364,170	2,230,194
2012	364,170	2,135,183	-	2,499,353	565,423	957,887	772,043	204,000	2,499,353
2013	204,000	2,244,000	-	2,448,000	300,000	927,574	865,692	354,734	2,448,000
GR (%)	**28.39**	**13.48**	**14.21**	**17.94**	**3.32**	**26.53**	**34.08**	**14.21**	**28.39**

Source: Department of Internal Trade, 2011. Unit: tons

Table 5.16 shows the result after an interview with the oil palm related sectors, including farmers, crude palm oil mils, palm oil refinery mils, and the government officers, to see the attitudes of them towards the establishment of the ASEAN Economic Community (AEC). The weakness in the potential of Thai palm oil production has made Thailand higher production costs and higher palm oil prices compared to Malaysia and Indonesia, which is both in large producer and exporter in the world. Therefore, after Thailand steps into the AEC and needs to reduce/cancel the non-tax restrictions on the request for permission to import palm oil may result in palm oil from Malaysia and Indonesia, which have a price advantage, will be imported into the country and compete with the domestic palm. If this is the case, the palm oil industry and other stakeholders may be affected.

Table 5.16 The impact of ASEAN Economic Community on the palm oil industry and other stakeholders

Sector	Impact
Producers	
- Farmer	The oil palm producers or farmers for the extraction and refining factories will be less affected than the independent palm oil producers because at least they have definite market supported.
- Crude palm oil mill	May face fierce competition from crude palm oil imported from Malaysia and Indonesia. The extraction plants that may be affected are extraction plants that are not affiliated with the company or are affiliated with the palm oil refinery mill. Most of them are small scale extraction plants with small production capacity and higher extraction costs than the large scale extraction plants.
- Palm oil refinery mill	There may be more ways to procure cheap raw materials for importation, whether in the form of crude palm oil or semi-refined palm oil, to produce palm oil for consumption and to use in further industrial. At the same time, they may face competition with refined palm oil imported from foreign countries to sell directly to consumers or related industries. However, bottled palm oil, used in the household sector, may not be affected much because the refined palm oil imported from Malaysia and Indonesia have a reddish and turbid color, but Thai consumers prefer using palm oil that has a clear yellow color.
Consumers	
- Crude palm oil mill	Continuous industries that use domestic palm oil, such as the food industry, and including the production of biodiesel will benefit from the import of palm oil, moreover, the adjustment to increase the production potential of the extraction plants and refinery in the country, which will help reduce the cost of palm oil use.
- Palm oil refinery mill	Will benefit from lower domestic palm oil prices due to competition between domestic and foreign operators, which will result in bottled palm oil, palm oil-based products, and including biodiesel, which will decrease the price down. Besides, if domestic production is insufficient for the demand, the import is one of the choices to help reduce the shortage of palm oil in the country.

Source: From an interview

However, the impact after entering the AEC, as discussed above, will have more or less impact which depends on various important factors such as the trend of demand for palm oil in the world market, and the situation of the production of palm oil of the major producing countries such as Malaysia and Indonesia. Furthermore, if the demand for consumption tends to increase, or the amount of palm oil produced to the world market is less, will push up the price of palm oil in the world market, which may cause the domestic and foreign palm oil spreads to decrease or similar, resulting in reduced demand for imported palm oil from foreign countries.

Anyway, the production potential and development of Thai's industries will have a better direction because Thailand has oil palm and palm oil strategy reform for the entire system for 20 years (2016-2036) to develop Thai's oil palm and palm oil into the oleochemical industry which will help to create additional value for palm products and strengthen the competitiveness of Thailand with other countries, including strengthening the Thai palm oil industry, raise the income level and better living life of oil palm producers. There are six aspects, including (1) production (2) innovation (3) standard (4) energy (5) marketing and (6) management (Department of Internal Trade, 2016), as follows:

1. Production: will increase yield per rai to 2.5-2.75 tons in 2017-2021 and increase to 2.75-3 tons in the year 2022-2026. In 2027-2031, it will be increased to 3-3.5 tons, and in 2032-2036 will be increased to 3.25-3.50 tons, while the same time will increase the plantation area from the current 4.81-5.23 million Rais to 6.06-7.23 million Rais in 2036, including reducing production costs.

Increase the percentage of oil in the oil palm to 22 percent within 2021 from the current at 17-18 percent, which will allow the farmers to get a better price, and will plan production in appropriate areas, for the areas that are not suitable, will encourage farmers to grow other crops instead. Promote the use of organic fertilizers and technology transfer.

2. Innovation: will develop the Thai industry, from the present most palm oil production just only for consumption, such as cooking palm oil, soap, cosmetics, skincare, cream, to the oleochemical industry for more additional value such as vitamin E, and biodiesel industry.

3. Standard: will push for the certification of oil palm according to the GAP standard and standardize the gathering oil palm yard (middle man), develop and promote oil percentage

meter from palm bunch, develop the extraction plant standard, increase the efficiency of the extraction plant, pushing production standards to international standards.

4. Energy: will increase the demand by increasing the proportion of crude palm oil in biodiesel production to be B10 by 2026 and increasing B20 in 2036.

5. Marketing: from to strategy to increase productivity per rai and increase plantation area, expected that in 2017-2021, Thailand will have 2.26-2.29 million tons of crude palm oil and will increase to 2.49-2.82 million tons in 2022-2026. In 2027-2031 will be increased to 3.78-6.31 million tons, which will manage the stock to be more efficient. Will cancel the palm market intervention from 2022 onwards and will float the price of bottled cooking palm oil to meet the market mechanism. From the present, the ceiling price is set at 42 THB per liter. At the same time, it will push the export of palm oil products to CLMV (Cambodia, Laos, Myanmar, and Vietnam), and products derived from innovation.

6. Management: Within the year 2017, the Royal Thai Government will propose a cabinet to approve the draft Oil Palm and Palm Oil Act, which the National Farmers Council has drafted and then presented to the Ministry of Agriculture and Cooperatives which is expected to be considered by the National Legislative Assembly (NIA) effective in 2018.

The overall production of Thailand, besides the production capacity that is less than Malaysia, it is still found that the problem of having a limited production area, which is an essential part of the production, more than 80 percent of production is for domestic consumption, only a small amount of production left for export, that makes it difficult to compete with major producers like Malaysia and Indonesia in expanding the market.

Since Thailand has a limited of suitable area for oil palm plantations when compared with the leading countries in oil palm plantations, the opening of the AEC is an excellent opportunity for Thailand to expand oil palm plantations to neighboring countries such as Myanmar, Laos, and Cambodia, according to a study by the Ministry of Agriculture and Cooperatives (cited in Kittisenachai, 2016). The suitable oil palm plantation area in Myanmar are Tanintharyi state and Kayin state. The benefits that investors will receive are the special rental rates, the same tax rates as the Burmese people, low-priced labor wages, government promotion policies, and the lower cost of transportation than other countries.

While in Laos, found that the suitable area for oil palm planting is Saravane province, Champasack province, Attapeu province, and Sekong province. The benefits that investors will receive are exemption of corporate income tax for 2-4 years, exempt from export tax, exempt from import raw materials used for production for export, have a lot of vacant land, a lot of water, labor can be trained, cheap wages, and investment promotion policies such as promoting agriculture and contract farming, etc.

Furthermore, in Cambodia, found that the area is suitable for oil palm plantations such as Battambang province, Pailin province, and Koh Kong province. The benefits that investors will receive are income tax exemption, income tax reduction after income tax exemption, exemption of import duties on equipment, machinery, and construction materials for projects produced to substitute imported raw materials, exemption of export duties. There is a policy to promote investment and have abounded natural resources.

Albeit oil palm has an economic value accounting for only 2.6 percent of the Gross Domestic Product (GDP) of the agricultural sector in 2011, it still plays a vital role in creating food and energy security for the country as well as creating a career for farmers. The government should not ignore over 120,000 Thai palm growers. The government has foreseen the impact from the beginning. Therefore, in 2004, the Ministry of Agriculture and Cooperatives established the Agricultural Production Structure Adjustment Fund to increase the country's competitiveness, known as the FTA Fund, to strengthen Thai farmers to cope with the AEC by supporting production factors, technology, research and development Including giving knowledge, training, and observing, etc. The past performance of more than 20,000 of the oil palm farmers participating in the project from 2006-2010 can reduce the production cost from 1,715 THB per ton to 1,340 THB per ton or decrease 375 THB per ton. Furthermore, the yield per rai increased from 2.430 tons per Rai to 3.240 tons per Rai or increased 0.810 tons per Rai (Cooperative Support Department, 2019).

The best way is to increase productivity per Rai and increase oil percentage in order to reduce costs, and the government should proactively provide knowledge to farmers, including supervising the oil palm ramps and extraction plants to buy quality palm fruit only. That should be a better way than to expand the area planted in inappropriate areas. Besides, the government may promote the palm oil industry from the oleochemical, this is an excellent future industry for small-scale extraction plants, and they must adapt by improving the production technology and may adjust the production structure fully integrated. The

extraction plant and refinery must reduce production costs to be able to compete with foreign countries.

As for the farmers, they should adjust themselves until they can stand on their own by combining in the form of cooperatives of small farmers or using the tools and technology together, they can reduce the cost to a certain extent in the long run if the costs cannot be lower or an equivalent competitor may affect the competitiveness of industries or products that use palm oil as part of the AEC in 2015.

CHAPTER 6

RESULT AND DISCUSSION

In this chapter will describe shortly about the characteristic of the study area in the general and socioeconomic condition which was obtained from secondary data and literature review, and will also focus on the general information of farmer (sample), general information of oil palm production in the study area, and farmer's perception of the impact of the AEC on each of specific domains, with the following details,

6.1 General Information of Southern Area in Thailand

Since the southern region of Thailand is tiny and narrow (Figure 6.1), there is no difference in general conditions, including the economic and social conditions of the people in the area.

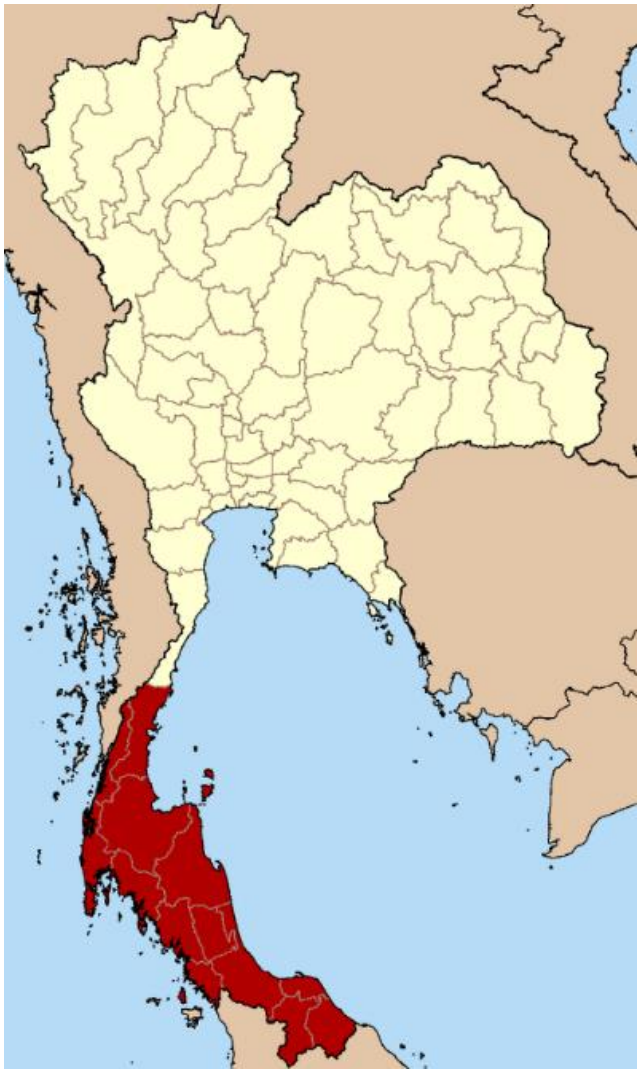
6.1.1 General Conditions

The southern region of Thailand is situated on the Malay Peninsula. Flanked by the Gulf of Thailand on the east coast with a length of 877 kilometers, and the Andaman Sea on the west coast, with a length of 1,093 kilometers. Consisting of 14 provinces, which are Chumphon, Surat Thani, Nakhon Si Thammarat, Phatthalung, Songkhla, Ranong, Phang Nga, Phuket, Krabi, Trang, Yala, Narathiwat, Pattani, and Satun. Myanmar borders the upper border for a short distance, and Malaysia borders the lower part, approximately 180 kilometers.

The southern region has a total area of 37.36 million Rais. There are two types of terrain, in the west, the Tanaosri and Phuket mountains, which are the origin of the rivers such as Kra Buri River and Tapi River. The central part of the region has the Nakhon Si Thammarat mountains stretching from the north to the south. The east side is a large flat area suitable for growing essential crops in the region, including important wetlands such as Thale Noi and Songkhla Lake, an area spread out on both sides of the sea, which is a significant tourist attraction of the region such as Koh Samui, Koh Phangan, Similan Island, Surin Island, Phi Phi Island, and Koh Lipe.

From the total area of 37.36 million Rais, there is a classification of forest area divided into 9.36 Rais or 25.0 percent of the regional area, mangrove forest area 1.3 million Rais, and agricultural landholding area 18.3 million Rais, most of which are rubber and oil palm plantations, about 15.9 million Rais or 86.9 percent of agricultural land, followed by rice fields and fruit growing area as 4.2 and 4.3 percent of the agricultural area, respectively (Office of the National Economic and Social Development Council, 2019).

The southern climate is tropical monsoon and rainy due to the influence of northeast monsoon, southeast monsoon, and southwest monsoon. The average temperature is around 32 degrees Celsius. The average rainfall is about 2,634 millimeters per year, higher than the national average (1,356 millimeters per year). It is suitable for growing tropical plants and having enough water for agriculture. Oil palm can grow well in a climate with constant rainfall throughout the year, with high humidity and intense sunlight, which matches most areas of the southern region.



Source: Wikipedia, 2019.

Figure 6.1 Location map of southern Thailand

6.1.2 Socioeconomic Condition

Table 6.1 shows that the southern economy is quite small. The value of local products at the annual price of 2017 is around 1,229,350 million THB, equivalent to 8 percent of the Gross Domestic Product, which is slightly decreased compared to the year 2013, equivalent to 8.1 percent of the country. The economic structure of the Southern region still relies on the agricultural sector. In 2017, the agricultural sector accounted for 21.1 percent, followed by the industrial sector 14.7 percent, for the service sector 64.2 percent, which consists of housing and food service, trade, transportation, and other services, as 15.7 percent, 11.7 percent, 7.7 percent, and 29.1 percent, respectively. With the production of the key agricultural sectors of the region, including rubber, oil palm, fishery, and fruit. However, the agricultural economic structure has a downward trend while the service sector has started to play an essential role in the economy of the southern region, and the proportion has increased steadily. In 2017, the agricultural sector had a production proportion of 21.6 percent, down from 27.6 percent in 2013 due to fluctuations in the price of major agricultural products in the area, especially rubber.

The economic growth of the southern region was at a low level. In 2017, the economy grew by 1.3 percent, which is lower than the growth of the country which grew by 4 percent due to the slowdown of the agricultural sector that is affected by the price of the product that has fallen, and the average growth rate during the five years (2013-2017) is 2.9 percent, while the average income per capita is high. In 2017, the gross regional product per capita was 164,155 THB per person per year. It is increased from 2016 (156,739 THB per person per year). Phuket has the highest gross product per capita, around 388,559 THB per person per year, followed by Phang Nga province with 266,768 THB per person per year, and Phatthalung province has the lowest with 71,298 THB per person per year.

Table 6.1 Gross product and economic structure of the southern region

List	2013	2014	2015	2016	2017
Gross Regional Product					
- Value (Million THB)	1,042,312	1,025,704	1,068,395	1,167,363	1,229,350
- Proportion of country (%)	8.1	7.8	7.8	8.0	8.0
- Actual growth rate (%)	5.0	0.2	3.9	4.3	1.3
GRP per capita					
- Value (Million THB)	142,649	139,468	144,336	156,739	164,115
- Actual growth rate (%)	1.3	- 2.2	3.5	8.6	4.7
Production structure (%)					
- Agricultural sector	27.6	25.0	20.9	21.6	21.1
- Industrial sector	16.9	16.8	17.1	15.1	14.7
• Mines	4.8	5.0	5.2	3.9	2.8
• Industry	12.1	11.8	12.0	11.1	11.9
- Service sector	55.5	58.1	62.0	63.4	64.2
• Wholesale, retail	9.7	10.1	10.2	11.0	11.7
• Transportation	6.1	7.5	8.0	7.6	7.7
• Accommodation and food services	9.6	10.3	13.4	14.6	15.7
• Others	30.1	30.2	30.5	30.1	29.1

Source: Office of the National Economic and Social Development Council, 2019.

The total population of the southern region increased above the national average. In 2017, the southern region had a population of around 7.37 million people. The average rate of population growth between 2012-2017 is 0.65 percent, while the country has an average growth rate of 0.53 percent. Nakhon Si Thammarat province has the largest population, around 1.56 million people, followed by Songkhla province with 1.42 million people, and Ranong is having the smallest population of 0.19 million people (Table 6.2).

Most of the workers in the southern region know the primary level or lower education. In 2017, there were 6.03 million labor forces, mainly in the agricultural sector, around 41.09 percent of the labor force of the region. There are 2.86 million people with primary education or lower education, while very few vocational and vocational education workers are found, or around 11.11 percent of the total workforce, which may result in a lack of skilled professionals in the future. There are 301,694 migrant workers from Myanmar, Laos, and Cambodia (as of December 2017) in the southern region. Most of the three nationality workers work on construction activities, agriculture and livestock, and domestic servants.

Table 6.2 Demographic and social data for the southern region

List	2013	2014	2015	2016	2017
Population (million people)	7.18	7.24	7.30	7.33	7.37
Population structure (%)					
0-14 years old	20.9	20.7	20.4	19.9	19.82
15-59 years old	66.1	66.0	65.9	62.6	65.63
Over 60 years old	13.0	13.3	17.5	17.5	14.55
Migrant workers	840,980	313,933	292,409	280,787	367,288

Source: Office of the National Economic and Social Development Council, 2019.

6.2 General Information of Farmer (Householder)

This study was done in 3 provinces in Southern Thailand, including Surat Thani, Krabi, and Chumphon, which separated by the district that has large oil palm production and the farming scale. General information of respondents consists of gender, age, education level, number of household members, and number of agricultural workers with the following details.

The study of general information of those respondents found that the proportion of gender of respondents quite different between males and females, with 24 percent of females and 76 percent of males. Mostly the respondents have aged between 41-50 years old, 39.5 percent, followed by 51-60 years old, 33.25 percent, and the average age is 52.59 years old.

About the education, found that all respondents had educational levels not higher than the Undergraduate level, most of them graduated from primary school (grade 4), 38.75 percent, followed by high school with 34.25 percent, and in this study found that 4.75 percent of the respondent has non-education.

About the household structure of respondents found that most of the samples have 4 family members in the household, representing 52.75 percent, followed by 3 people in each household, representing 29.5 percent with an average of 3.75 members in the household (Table 6.3).

Table 6.3 Number and percentage of general information of samples in the study area

Information	Number of respondents (people)	Percentage
Gender		
Male	304	76
Female	96	24
Age		
Lower than 30	12	3
30 – 40	69	17.25
41 – 50	158	39.5
51 – 60	133	33.25
Over 60	28	7
	Average = 47.92	

Information	Number of respondents (people)	Percentage
Education		
None Education	19	4.75
Primary School	155	38.75
Secondary School	54	13.5
High School	137	34.25
Undergraduate	35	8.75
Family Member		
2 people	18	4.5
3 people	118	29.5
4 people	211	52.75
More than 5 people	53	13.25
	Average 3.79	

Source: From the study

The socio-economic data of the respondents consisted of the main occupation, secondary occupation, household income, holding area, which showed the socio-economic conditions of the study sample.

The economic and social study of the sample found that 100 percent of the sample has agricultural as a primary occupation because the aim of this study is only oil palm producers. Mostly for 63.5 percent of the samples do not have an alternative occupation, they only work in the agricultural sector, but there is 22.25 percent work on his own and also work as labor inside the agricultural sector in the neighborhood. Around 12.75 percent are working as labor outside the agricultural sector, such as a carpenter or part-time in the business sector, and 1.5 percent of the samples have their own local business (family business), for example, grocery store, motorcycle repair shop, or clothing repair shop.

From the household's total income study, found that most of the sample has a net income of around 100,000-300,000 THB per year, equivalent to 60.5 percent, followed by a net income 300,001-500,000 THB per year or 19 percent. From the study result if comparing the average income of the sample group with the report of poverty line and income distribution of Thailand year 2016, found that the samples have average income above the poverty line,

namely the average income of samples is around 339,687.39 THB per year while the poverty line and income distribution of Thailand is around 212,980 THB per year

If we look at the total farm income, found that the respondents have the most significant part of income from the agricultural sector, on average is around 282,551.49 THB per year per household, If take a look closer to the range of income, found that mostly the sample have total farm income at 100,000-300,000 THB per year, followed by 300,001-500,000 THB per year and less than 100,000 THB per year, as percentage 72, 12, and 10.25 respectively.

The table also shows that mostly or 38.75 percent of the respondents have a holding area around 26–35 Rais followed by 16–25 Rais or 26.5 percent. On average, the respondents have a holding area around 35.46 Rais per household.

Table 6.4 Number and percentage of the socio-economic data of sample

Information	Number of respondents (people)	Percentage
Main occupation in Agricultural	400	100
Alternative occupation		
None	254	63.5
Labor inside the agricultural sector	89	22.25
Labor outside the agricultural sector	51	12.75
Family business	6	1.5
Household's total income		
Less than 100,000 THB/year	47	11.75
100,000 -300,000 THB/year	242	60.5
300,001 -500,000 THB/year	76	19
500,001 -1,000,000 THB/year	14	3.5
More than 1,000,000 THB/year	21	5.25
	Average 294,492.65 THB/year	
Total farm income		
Less than 100,000 THB/year	41	10.25
100,000 -300,000 THB/year	288	72
300,001 -500,000 THB/year	48	12
500,001 -1,000,000 THB/year	5	1.25
More than 1,000,000 THB/year	18	4.5
	Average 301,255.89 THB/year	
Total holding area (Rais)		
Less than 15 Rais	38	9.5
16 – 25 Rais	106	26.5
26 – 35 Rais	155	38.75
36 – 45 Rais	18	4.5
46 – 55 Rais	2	0.5
56 – 65 Rais	8	2
More than 65 Rais	73	18.25
	Average 35.53 Rais	

Source: From the study

6.3 General Information of Oil Palm Production of Respondents

As mentioned in chapter 5, oil palm has more than hundreds of varieties or species, but almost all of the oil palm varieties that popular now generally are hybrid species. The interview found that mostly the respondents are likely to plant Hybrid Tenera (DxP) and Hybrid Surat Thani 2 than another species, for 39 percent and 33 percent, respectively (Table 6.5).

Table 6.5 Oil palm species

Oil palm species	Number of respondents (people)	Percentage
Hybrid Tenera (DxP)	156	39
Hybrid Surat Thani 1	34	8.5
Hybrid Surat Thani 2	132	33
Hybrid Surat Thani 3	63	15.75
other	15	3.75

Source: From the study

Table 6.6 found that most of the samples have two people in the family that work in oil palm production, 60.75 percent, followed by one person for 24.25 percent, and three people for 15 percent. On average, the family member that working in oil palm production is 1.91 people per household.

Table 6.6 Family member working in oil palm production

Information	Number of respondents (people)	Percentage
1 person	97	24.25
2 people	243	60.75
3 people	60	15
	Average = 1.91	

Source: From the study

The study (table 6.7) found that from 400 samples, mostly, they have planted oil palm (current crop) for quite long, 16-20 years for 35.5 percent, followed by 11-15 years for 34.5 percent, and 13 percent of the sample have grown oil palm for 6-10 years. Take a look closely will see that 0.5 percent of the sample already planted oil palm for more than 25 years. In this case, they already replant oil palm in the same area for the new generation. Also, the farmers have experience in an oil palm plantation, on average is around 16.32 years. Before they changed to plant oil palm, mostly the sample used to have rice, coffee, and rubber tree, for 34.5 percent, 26.25 percent, and 15.25 percent, respectively.

The main reason that the sample has changed from another crop to oil palm is the revenue from oil palm production (78 percent of the respondents), that is because oil palm starts to produce fruit after two and a half or three years after its planting if compare to another crop like rubber tree which has to wait for 6 or 7 years, and oil palm remains productive for more than twenty-five years. Moreover, oil palm harvests typically through all the year and provides satisfactory returns due to perceived high prices. Therefore, oil palm plantations provide a stable income for oil palm farmers. Another reason is that the oil palm production process is not too complicated (12.25 percent of the respondents). It does not need much care for entirely maintenance from a farmer, and then they will have more free time to do alternative jobs for a living.

Furthermore, the source of funds that the respondents use to invest in the oil palm plantation found that 100 percent of the respondents get self-funding, and around 79 percent get the loan from the bank. Look closely, even there are many supports from the government or bank, but still, 0.5 percent borrowed money from the loan shark. This is one of the serious problems in Thailand. Non-formal loan providers are not in the financial institution system. Most will charge interest at a rate that is higher than the prescribed financial institution by telling a small amount of interest or rebate to attract borrowers. Some lenders also force the debtor to sign a loan agreement that does not fill in the text or specify the amount of the loan in excess of the amount, such as a loan of 10,000 THB, but to fill the number up to 30,000 THB, and the scariest thing is that the debt is paid cruelly or illegally such as blackmail abuse or physical abuse.

Table 6.7 General information about oil palm planting of sample

Information	Number of respondents (people)	Percentage
Current Oil palm has been planted for		
1-5 years	36	9
6-10 years	52	13
11-15 years	138	34.5
16-20 years	142	35.5
20- 25 years	30	7.5
over 25 years	2	0.5
	Average = 14.56	
Experiences in Oil palm plantation		
Less than 3 years	13	3.25
3-5 years	11	2.75
6-10 years	32	8
11-15 years	111	27.75
16-20	181	45.25
21-25	40	10
Over 25 years	12	3
	Average = 16.32 years	
The crop that has planted before oil palm		
Coffee	105	26.25
Rice	138	34.5
Rubber Tree	61	15.25
Wilderness area	19	4.75
Others	77	19.25
The reasons why have changed from another crop to oil palm		
Revenue	312	78
Production process	49	12.25
Support from government	12	3
Follow the others	17	4.25
Others	10	2.5
Source of funds		
Self-funding	400	100
Government support	121	30.25
Bank	316	79
Loan shark	2	0.5
Other (relative, friends, etc.)	59	14.75

Source: From the study

From table 6.8, shows that mostly the respondents have of oil palm production area around 16-25 Rais or 39.255 percent followed by 26-35 Rais and less than 15 Rais or 20.25 percent and 17.25 percent, respectively. On average, the respondents have an oil palm production area around 33.03 Rais per household. Which if we look at the land property right, all of the farmers have their own land, they separate the land for multiple purposes such as for growing main crop such as oil palm, for building a house or living area, for the planting of another crop, for fish pounds or other animals, etc.

The table also shows that most of the sample have income from oil palm production around 100,000-300,000 THB per year, equivalent to 71 percent, followed by less than 100,000 THB per year or 13.25 percent of all the respondents.

Table 6.8 Oil palm plantation area, land property right, and income from oil palm production of sample

Information	Number of respondents (people)	Percentage
Area of oil palm production		
Less than 15 Rais	69	17.25
16 – 25 Rais	157	39.25
26 – 35 Rais	81	20.25
36 – 45 Rais	5	1.25
46 – 55 Rais	7	1.75
56 – 65 Rais	22	5.5
More than 65 Rais	59	14.75
	Average 30.55 Rais	
Average crop size	Average 14.09 Rais	
Land property right		
Owner	400	100
Income from oil palm production		
Less than 100,000 THB/year	53	13.25
100,000 -300,000 THB/year	284	71
300,001 -500,000 THB/year	40	10
500,001 -1,000,000 THB/year	5	1.25
More than 1,000,000 THB/year	18	4.5
	Average 280,926 THB/year	

Source: From the study

Table 6.9 Production cost and return on oil palm plantation

Activities	Thai Baht/Rai/Year
1. Available cost	**6,009.93**
1.1 Labor	2,111.49
- Maintenance	842.23
- Harvest	1,269.26
1.2 Input factors	3,479.15
- Fertilizer	2,957.39
- Pesticides and weed prevention	360.11
- Fuel and lubrication	83.95
- Agricultural materials and supplies	69.50
- Agricultural equipment repair	8.20
1.3 Investment interest	419.29
2. Fixed cost	**941.60**
2.1 Land rental	515.91
2.2 Agricultural equipment depreciation	36.78
2.3 Investment interest in agricultural equipment	3.32
2.4 Average cost before a yield (young plant, land preparation, etc.)	385.59
3. Total cost	**6,951.53**
4. Total cost per kilogram	**2.18**
5. Available cost per kilogram	**1.89**
6. Average Yield / Rai/ year	**3,186**
7. The average price of Oil Palm	**3.39**
8. Total income	**10,800.54**
9. Net income/Rai	**3,849.01**
10. Net income/kg	**1.21**

Source: From the study

Table 6.9 shows the production cost and return on oil palm plantation in the study area. From the interview, found that the cost of Oil Palm production can be separated into two types.

First is an available cost which including labor, input factors, and investment interest. Mostly the labor for oil palm production is hired external labor. The harvesting is often done by external teams who get paid according to the weight of fruit harvested and the cost of transportation to bring oil palm fresh fruit bunches to ramps by pick-up trucks. In the end, their wages vary depending on harvested outputs, but usually higher than the minimum wages for industrial labor in Thailand, and only 10 percent of Thai oil palm planters were adequately managing their farms by themselves. Other than this, they also work on the

maintenance job, for example, to cut or trim the leaves, to put fertilizer, to remove the weed. The study found that the farmer has to pay around 2,111.49 THB per Rai per year to hire labor.

The cost for other available input factors such as the fertilizer, pesticides and weed prevention, fuel and lubrication, agricultural materials and supplies, and agricultural equipment repair are around 3,479.15 THB per Rai per year. The cost for investment interest that the farmer has to pay to the bank or loan institution is around 419.29 THB per Rai per year. In total, the available cost is around 6,009.93 THB per Rai per year.

The fixed cost that the farmer has to pay is around 941.60 THB per Rai per year, which including land rental (which calculated from the opportunity cost), agricultural equipment depreciation, investment interest in agricultural equipment, average cost before a yield (young plant, land preparation). The total cost (fixed and available cost) is 6,951.53 THB per Rai per year in total or 2.18 THB per kilogram.

Table 6.9 also shows that the Oil Palm production has an average yield of around 3,186 kilograms per Rai per year, and the average price that the farmer gets is around 3.39 THB per kilogram. Then the calculation of total income is around 10,800.54 THB per Rai per year. If analyze with the cost, then the net income of the farmer is around 3,849.01 THB per Rai per year.

6.4 Analysis and Discussion of the Results

This section shows the result of the influence of farmer characteristics and production variables, which generate by gender, class of age, class of education, and the class of the area, and the discussion about results with other studies made for oil palm in Thailand and Southeast Asia.

6.4.1 Gender Analysis

Table 6.10 and Table 6.11 show the result of CROSSTAB (Chi-Square Test) and ANOVA (F-Test) analysis between gender and other variables, found that gender has a profound impact on marital status, total family member, farm size, source of money for investment on oil palm plantation, harvesting cost, and total cost per kilogram of oil palm.

The study found that 76 percent of the respondents are male. Generally, in Thailand, men are the head of the family and have more power in decision-making. The analysis result shows that the gender of the respondent influences the marital status at a 99 percent confidence level. If the respondents are female there is a bigger chance to be widow because now they have to be the one who leads the family and at 90 percent confidence level found that the total family member is smaller if the respondents are female, that makes sense since they lose their leader of the family (husband) already. The farm size is also influenced by gender, only 11 percent of female respondents holding the big area while it is almost double for the male respondents (at 95 percent confidence level).

Table 6.10 CROSSTAB and Chi-Square Test between gender and other variables

Variables	Gender		Chi-square (p-value)
	Male (percent)	Female (percent)	
Marital Status			**27.954 (0.000)*** **
Single	1.0	0.0	
Married	96.7	84.4	
Divorced	1.3	4.2	
Widow	1.0	11.5	
Class of Education			2.773 (0.250)
None or primary	41.8	49.0	
Secondary and high school	48.4	45.8	
Graduate and above	9.9	5.2	
Sub Occupation			5.445 (0.142)
None	66.4	54.2	
Labor inside the agricultural sector	20.1	29.2	
Labor outside the agricultural sector	11.8	15.6	
Family business	1.6	1.0	
Total Family Member			**9.847 (0.080)***
2 people	3.9	6.3	
3 people	28.0	34.4	
4 people	55.6	43.8	
5 people	10.2	8.3	
6 people	2.0	5.2	
7 people	0.3	2.1	
Farm size			**4.154 (0.042)****
Smallholder	79.3	88.5	
Large holder	20.7	11.5	
Reason to plant oil palm			
Revenue	78.0	78.1	0.001 (0.973)
Production process	11.5	14.6	0.640 (0.424)
Support from government	2.6	3.1	0.066 (0.797)
Follow the Others	4.9	2.1	1.457 (0.227)
Other	2.3	3.1	0.202 (0.653)
Total Family Member Working in Oil Palm Production			0.932 (0.818)
1 person	23.7	26.0	
2 people	61.5	51.3	
3 people	14.5	16.7	
5 people	0.3	0.0	
Buyer			0.733 (0.693)
Middleman	92.8	90.6	
Mill	5.9	8.3	
Other	1.3	1.0	

Variables	Gender		Chi-square (p-value)
	Male (percent)	Female (percent)	
Reason to Sell Oil Palm to Buyer			4.437 (0.350)
Better price	82.2	83.3	
Friendship	4.3	7.3	
More comfortable for transportation	5.3	4.2	
Contract	3.3	4.2	
Other	4.9	1.0	
Source of Money for Investment			
Self-funding	100	100	
Government	27.6	38.5	**4.116 (0.042)****
Bank	80.9	72.9	**2.818 (0.093)***
Loan Shark	0.3	1.0	0.745 (0.388)
Other	15.1	13.5	0.147 (0.702)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

Table 6.11 ANOVA and F-Test between gender and other variables

Variables	Mean by Gender		F-test
	Male	Female	(p-value)
Total Household Income	305,422.04	259,716.26	1.306 (0.254)
Total Farm Income	302,910.24	296,017.09	0.024 (0.877)
Total Production of Oil Palm (ton per year)	64.05	86.61	1.252 (0.264)
Total Oil Palm Income	278,498.21	288,616.06	0.093 (0.761)
Years of plantation	14.64	14.32	0.242 (0.623)
Production Cost per Rai per Year			
Labor	2,137.53	2,029.02	0.539 (0.463)
Maintenance	841.66	844.01	0.936(0.334)
Harvesting	1,270.46	1,265.44	**3.055 (0.081)***
Input	3,479.82	3,477.02	1.680 (0.196)
Fertilizer	2,958.61	2,953.50	1.554 (0.213)
Pesticides and Weed Prevention	361.33	356.21	2.707 (0.101)

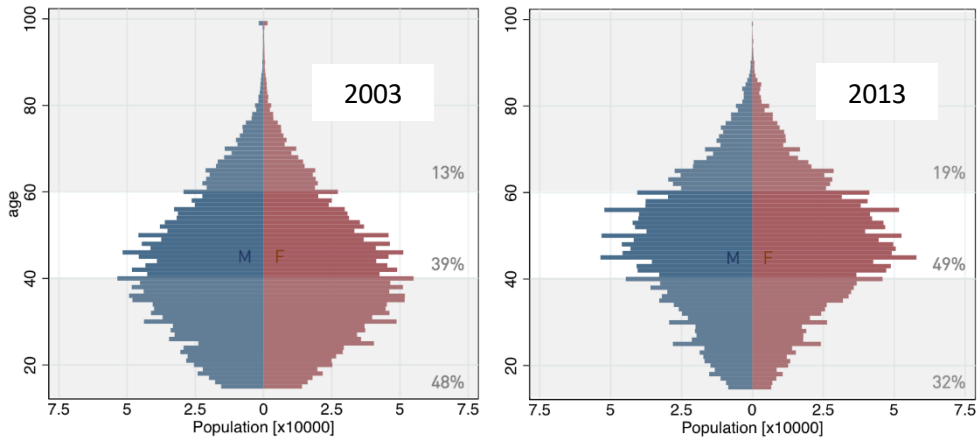
Variables	Mean by Gender		F-test
	Male	Female	(p-value)
Fuel and Lubrication	84.00	83.77	0.258 (0.612)
Agricultural Materials and Supplies	69.51	69.44	0.151 (0.698)
Agricultural Equipment Repair	8.19	8.21	0.170 (0.680)
Investment Interest	419.38	418.98	1.486 (0.224)
Fixed Cost	941.70	941.25	0.584(0.445)
Land Rental	515.47	517.28	0.363 (0.547)
Agricultural Equipment Depreciation	37.10	35.74	0.590 (0.443)
Investment Interest in Agricultural Equipment	3.32	3.30	0.184 (0.668)
Average Cost Before Yield	385.67	385.33	0.623 (0.430)
Total Cost	6,951.60	6,951.28	1.115 (0.292)
Total Cost per kilogram	2.19	2.13	**4.098 (0.044)****
Available Cost per kilogram	1.89	1.86	0.499 (0.480)
Average Yield per Rai per Year	3,184.84	3,189.65	0.488 (0.485)
Average Price	3.38	3.39	0.044 (0.834)
Total Income per Rai per Year	10,806.13	10,782.84	0.285 (0.594)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

6.4.2 Age Analysis

The Thai agricultural sector is facing the aging problem of labor, which is faster than the overall picture of Thailand, which is stepping into a more advanced society. Figure 6.2 shows that the proportion of older agricultural workers aged 40-60 years increased from 39 percent in 2003 to 49 percent in 2013, as well as the proportion of older workers over 60 years increased in opposite directions with the proportion of young workers (15-40 years) dropped significantly from 48 percent to 32 percent during the same period. When compared with the country's population structure from the Department of Provincial Administration, it is found that the population of the country aged 15-40 years, 40-60 years, and more than 60 years in 2017 are 51 percent, 35 percent, and 14 percent respectively.



Source: Puey Ungphakorn Institute for Economic Research, 2019.

Figure 6.2 Number of agricultural laborers by age and gender

Currently, the farmers in Thailand can divide into two age groups, based on the technology acceptance level which comply with the "Thailand 4.0" model, the government needs the resulting in the transition from traditional agriculture to modern agriculture, dividing the age range of the new generation of farmers from 17 to 45 years old.

Table 6.12 and table 6.13 show the result of CROSSTAB (Chi-Square Test) and ANOVA (F-Test) analysis between class of age and other variables, found that class of age influences the source of money to invest on oil palm plantation, total household income, the cost of agricultural material and supplies, and fixed cost on oil palm plantation.

Table 6.12 CROSSTAB and Chi-Square Test between the class of age and other variables

Variables	Class of Age		Chi-square (p-value)
	Young Farmer (percent)	Old Farmer (percent)	
Marital Status			3.243 (0.356)
Single	1.5	0.0	
Married	94.8	94.7	
Divorced	2.1	1.9	
Widow	3.6	3.4	
Class of Education			1.747 (0.417)
None or primary	42.3	44.7	
Secondary and high school	50.5	45.1	
Graduate and above	7.2	10.2	
Sub Occupation			0.492 (0.921)
None	62.9	64.1	
Labor inside the agricultural sector	21.6	22.8	
Labor outside the agricultural sector	13.9	11.7	
Family business	1.5	1.5	
Total Family Member			4.450 (0.487)
2 people	5.7	3.4	
3 people	30.4	28.6	
4 people	51.0	54.1	
5 people	9.8	9.7	
6 people	3.1	2.4	
7 people	0.0	1.5	
Farm size			1.121 (0.290)
Smallholder	79.4	83.5	
Large holder	20.6	16.5	
Reason to plant oil palm			
Revenue	77.8	78.2	0.006 (0.938)
Production process	11.3	13.1	0.290 (0.590)
Support from government	2.6	2.9	0.042 (0.838)
Follow the Others	3.1	5.3	1.240 (0.266)
Other	3.6	1.5	1.898 (0.168)
Total Family Member Working in Oil Palm Production			1.528 (0.676)
1 person	25.3	23.3	
2 people	58.8	62.1	
3 people	16.0	14.1	
5 people	0.0	0.5	
Buyer			2.328 (0.312)
Middleman	94.3	90.3	
Mill	4.6	8.3	
Other	1.0	1.5	

Variables	Class of Age		Chi-square (p-value)
	Young Farmer (percent)	Old Farmer (percent)	
Reason to Sell Oil Palm to Buyer			1.036 (0.904)
Better price	83.5	81.6	
Friendship	5.2	4.9	
More comfortable for transportation	5.2	4.9	
Contract	3.1	3.9	
Other	3.1	4.9	
Source of Money for Investment			
Self-funding	100	100	
Government	2.84	32.0	0.644 (0.422)
Bank	83.5	74.8	**4.609 (0.032)****
Loan Shark	0.5	0.5	0.002 (0.966)
Other	16.0	13.6	0.453 (0.501)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

Table 6.13 ANOVA and F-Test between the class of age and other variables

Variables	Mean by Class of Age		F-test (p-value)
	Young Farmer	Old Farmer	
Total Household Income	332,023.21	259,070.67	**4.594 (0.033)****
Total Farm Income	273,824.84	327,089.00	1.957 (0.163)
Total Production of Oil Palm (ton per year)	63.44	75.13	0.459 (0.498)
Total Oil Palm Income	290,824.45	271,605.13	0.458 (0.499)
Years of plantation	14.76	14.37	0.484 (0.487)
Production Cost per Rai per Year			
Labor	2,120.54	2,102.96	0.019 (0.889)
Maintenance	841.59	842.82	0.351 (0.554)
Harvesting	1,269.22	1,269.29	0.001 (0.979)
Input	3,479.30	3,479.00	0.026 (0.872)
Fertilizer	2,958.94	2,955.92	0.739 (0.391)
Pesticides and Weed Prevention	362.07	358.25	2.060 (0.152)
Fuel and Lubrication	83.68	84.20	1.785 (0.182)
Agricultural Materials and Supplies	69.36	69.62	**3.222 (0.073)***
Agricultural Equipment Repair	8.23	8.16	1.901 (0.169)
Investment Interest	419.24	419.33	0.085 (0.771)
Fixed Cost	941.08	942.08	**4.013 (0.046)****
Land Rental	514.55	517.18	1.063 (0.303)
Agricultural Equipment Depreciation	36.23	37.29	0.484 (0.487)

Variables	Mean by Class of Age		F-test
	Young Farmer	Old Farmer	(p-value)
Investment Interest in Agricultural Equipment	3.33	3.30	1.865 (0.173)
Average Cost Before Yield	385.47	385.70	0.382 (0.537)
Total Cost	6,951.49	6,951.56	0.063 (0.802)
Total Cost per kilogram	2.16	2.19	1.013 (0.315)
Available Cost per kilogram	1.86	1.91	2.410 (0.121)
Average Yield per Rai per Year	3,181.69	3,190.05	2.025 (0.156)
Average Price	3.39	3.38	0.257 (0.612)
Total Income per Rai per Year	10,785.10	10,815.08	0.648 (0.421)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

6.4.3 Education Analysis

Table 6.14 and table 6.15 show the result of CROSSTAB (Chi-Square Test) and ANOVA (F-Test) analysis between class of education and other variables, found that class of education influences on farm size, total family member that is working on oil palm production, the input cost, the agricultural equipment repair, and the total cost per kilogram of oil palm plantation.

The study found that at 90 percent confidence level, the farm size is influenced by the level of study, if the farmer get higher education, the chance to hold the larger size of land is smaller that is because the idea to emphasizing integrated agriculture, exquisite agriculture, using "less is more" concepts, and apply the sufficiency economy philosophy on the production system. According to those concepts and the knowledge, help the farmer to reduce the production cost if compared to the farmer that has a lower education level.

Table 6.14 CROSSTAB and Chi-Square Test between the class of education and other variables

Variables	Class of Education			Chi-square (p-value)
	None or primary (percent)	Secondary and High School (percent)	Graduate and above (percent)	
Marital Status				4.255 (0.642)
Single	1.1	0.5	0.0	
Married	91.4	95.3	97.1	
Divorced	2.3	2.1	0.0	
Widow	5.2	2.1	2.9	

Variables	Class of Education			Chi-square (p-value)
	None or primary (percent)	Secondary and High School (percent)	Graduate and above (percent)	
Sub Occupation				5.897 (0.437)
None	65.5	62.8	57.1	
Labor inside the agricultural sector	22.4	22.0	22.9	
Labor outside the agricultural sector	11.5	13.6	14.3	
Family business	0.6	1.6	5.7	
Total Family Member				10.026(0.438)
2 people	4.6	4.2	5.7	
3 people	25.9	30.4	42.9	
4 people	57.5	49.7	45.7	
5 people	9.8	11.0	2.9	
6 people	2.3	3.1	2.9	
7 people	0.0	1.6	0	
Farm size				**7.350 (0.025)****
Smallholder	75.9	84.8	91.4	
Large holder	24.1	15.2	8.6	
Reason to plant oil palm				
Revenue	79.9	74.9	85.7	2.665 (0.264)
Production process	12.6	13.6	2.9	3.228 (0.199)
Support from government	1.7	4.2	0	3.152 (0.207)
Follow the Others	4.0	4.2	5.7	0.208 (0.901)
Other	3.4	1.6	2.9	0.337 (0.512)
Total Family Member Working in Oil Palm Production				**15.301 (0.018)****
1 person	25.9	22.0	28.6	
2 people	62.1	61.8	45.7	
3 people	12.1	16.2	22.9	
5 people	0.0	0.0	2.9	
Buyer				4.365 (0.359)
Middleman	93.1	92.7	85.7	
Mill	5.7	5.8	14.3	
Other	1.1	1.6	0	
Reason to Sell Oil Palm to Buyer				8.068 (0.427)
Better price	85.1	82.2	71.4	
Friendship	2.9	6.8	5.7	
More comfortable for transportation	5.2	3.7	11.4	

Variables	Class of Education			Chi-square (p-value)
	None or primary (percent)	Secondary and High School (percent)	Graduate and above (percent)	
Contract	3.4	3.1	5.7	
Other	3.4	4.2	5.7	
Source of Money for Investment				
Self-funding	100	100	100	
Government	33.9	28.3	22.9	2.364 (0.307)
Bank	76.4	81.2	80.0	1.243 (0.537)
Loan Shark	0.6	0.5	0	0.198 (0.906)
Other	14.4	15.2	14.3	0.55 (0.973)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

Table 6.15 ANOVA and F-Test between the class of education and other variables

Variables	Mean by Class of Education			F-test (p-value)
	None or primary	Secondary and High School	Graduate and above	
Total Household Income	281,920.64	296,250.26	346,944.85	0.531 (0.588)
Total Farm Income	331,579.68	276,725.87	284,367.06	0.981 (0.376)
Total Production of Oil Palm (ton per year)	87.27	56.97	49.08	1.682 (0.187)
Total Oil Palm Income	273,005.60	288,585.02	278,511.02	0.138 (0.871)
Years of plantation	14.19	15.07	13.65	1.638 (0.196)
Production Cost per Rai per Year				
Labor	2,023.36	2,211.18	2,005.52	1.145 (0.319)
Maintenance	841.96	842.51	841.99	0.034 (0.967)
Harvesting	1,268.01	1,268.51	1,279.50	3.393 (0.305)
Input	3,476.75	3,481.70	3,477.06	**3.569 (0.029)****
Fertilizer	2,954.90	2,958.83	2,961.87	0.885 (0.414)
Pesticides and Weed Prevention	359.89	360.52	358.91	0.064 (0.938)
Fuel and Lubrication	84.07	83.72	84.54	0.833 (0.436)
Agricultural Materials and Supplies	69.62	69.39	69.47	1.146 (0.319)
Agricultural Equipment Repair	8.19	8.23	8.03	**2.626 (0.074)***
Investment Interest	419.04	419.47	419.47	1.104 (0.333)
Fixed Cost	941.20	941.88	942.02	0.976 (0.378)
Land Rental	514.02	517.39	517.16	0.838 (0.433)

Variables	Mean by Class of Education			F-test (p-value)
	None or primary	Secondary and High School	Graduate and above	
Agricultural Equipment Depreciation	35.84	37.60	36.90	0.617 (0.540)
Investment Interest in Agricultural Equipment	3.32	3.31	3.33	0.185 (0.831)
Average Cost Before Yield	385.68	385.48	385.66	0.141 (0.868)
Total Cost	6,951.55	6,951.55	6,951.26	0.207 (0.813)
Total Cost per kilogram	2.19	2.18	2.07	**3.941 (0.020)****
Available Cost per kilogram	1.85	1.90	1.95	1.332 (0.265)
Average Yield per Rai per Year	3,191.13	3,182.43	3,179.92	1.201 (0.302)
Average Price	3.38	3.38	3.39	0.024 (0.976)
Total Income per Rai per Year	10,813.86	10,766.80	10,800.54	0.303 (0.738)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

6.4.4 Farm Size Analysis

Most of the farmers in the country are small-scale farmers, who hold a small amount of land and the size of arable land tends to decrease continuously. Considering the cumulative distribution of arable land by household in 2017. Fifty percent of agricultural households still have less than 10 Rais of land, and nearly 80 percent of arable land is less than 20 Rais. When comparing with the year 2013 and 2003, found that the size of arable land has continuously decreased in all groups of farmers.

On average, Thai agricultural households have 14.3 rai of arable land. Most agricultural households with the sizeable arable land area are in the central region and the lower northern region, especially rice farmers, sugarcane, corn, cassava, and rubber producers in some provinces of the southern region. When compared from 2003-2013, the size of arable land has decreased in almost every region except for the northern region, which mainly increases the size of arable land without ownership. However, the size of arable land of Thai agricultural households is still large when compared to many developing countries in Asia such as Vietnam, Indonesia, Cambodia, or India with arable land sizes 3.9, 5.8, 8.2, 8.3 Rais respectively (FAO, 2015, Lowder et al. 2016).

As a result of the above problems, the government has encouraged farmers to gather into large plots in many provinces that are important oil palm production sources such as Krabi, Surat Thani, Chumphon, Trang, with the goal of encouraging co-operation and procuring factors, production, resulting in marketing planning in order to reduce costs, increase productivity, produce quality agricultural products, which increase opportunities and competitiveness of agricultural products under the support and integration of government agencies and associated agencies. The farm size in Thailand has classified into two groups, smallholders who have a holding area of less than 62.5 Rai, and a Large holder is holding area more than 62.5 Rai.

Table 6.16 and table 6.17 show the result of CROSSTAB (Chi-Square Test) and ANOVA (F-Test) analysis between the class of farm size and other variables, found that class of farm size influences on total farm income, total production of oil palm, and land rental cost. If the farmers hold the larger size of land, they will get more farm income and better productivity of oil palm. On another hand, from the fact that the arable land is decreasing, the smallholders need to pay for the rental more if they need to continue the agricultural practice.

Table 6.16 CROSSTAB and Chi-Square Test between the class of farm size and other variables

Variables	Class of Farm Size		Chi-square (p-value)
	Smallholder (percent)	Large holder (percent)	
Marital Status			4.975 (0.174)
Single	0.3	2.7	
Married	93.9	93.2	
Divorced	2.1	1.4	
Widow	3.7	2.7	
Class of Education			2.773 (0.250)
None or primary	41.8	49.0	
Secondary and high school	48.4	45.8	
Graduate and above	9.9	5.2	
Sub Occupation			6.138 (0.105)
None	63.5	63.5	
Labor inside the agricultural sector	20.6	29.7	
Labor outside the agricultural sector	14.4	5.4	
Family business	1.5	1.4	
Total Family Member			2.956 (0.707)
2 people	4.9	2.7	
3 people	28.8	32.4	
4 people	52.1	55.4	
5 people	10.4	6.8	
6 people	3.1	1.4	
7 people	0.6	1.4	
Reason to plant oil palm			
Revenue	79.4	71.6	2.153 (0.142)
Production process	11.0	17.6	2.388 (0.122)
Support from government	2.5	4.1	0.577 (0.447)
Follow the Others	4.9	2.1	0.009 (0.962)
Other	2.5	2.7	0.015 (0.902)
Total Family Member Working in Oil Palm Production			1.502 (0.682)
1 person	23.9	25.7	
2 people	59.8	63.5	
3 people	16.0	10.8	
5 people	0.3	0.0	
Buyer			0.897 (0.638)
Middleman	91.7	94.6	
Mill	7.1	4.1	
Other	1.2	1.4	
Reason to Sell Oil Palm to Buyer			2.051 (0.726)
Better price	83.4	78.4	
Friendship	4.3	8.1	
More comfortable for transportation	4.9	5.4	
Contract	3.4	4.1	

Variables	Class of Farm Size		Chi-square (p-value)
	Smallholder (percent)	Large holder (percent)	
Other	4.0	4.1	
Source of Money for Investment			
Self-funding	100	100	
Government	31.0	27.0	0.447 (0.504)
Bank	79.1	78.4	0.210 (0.884)
Loan Shark	0.6	0.0	0.456 (0.499)
Other	14.4	16.2	0.155 (0.694)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

Table 6.17 ANOVA and F-Test between the class of farm size and other variables

Variables	Mean by Class of Farm Size		F-test (p-value)
	Smallholder	Large holder	
Total Household Income	299,112.17	273,925.58	0.327 (0.568)
Total Farm Income	273,908.87	421,730.56	**9.265 (0.002)*****
Total Production of Oil Palm (ton per year)	47.35	166.86	**31.208 (0.000)*****
Total Oil Palm Income	275,187.33	306,209.87	0.721 (0.396)
Years of plantation	14.46	15.01	0.578 (0.448)
Production Cost per Rai per Year			
Labor	2,078.78	2,255.55	1.185 (0.277)
Maintenance	842.70	840.15	0.907 (0.342)
Harvesting	1,269.28	1,269.14	0.002 (0.964)
Input	3,479.68	3,476.77	1.509 (0.220)
Fertilizer	2,955.98	2,963.58	2.847 (0.092)
Pesticides and Weed Prevention	359.14	364.33	2.294 (0.131)
Fuel and Lubrication	84.07	83.41	1.743 (0.188)
Agricultural Materials and Supplies	69.46	69.63	0.719 (0.397)
Agricultural Equipment Repair	8.21	8.14	1.359 (0.244)
Investment Interest	419.33	419.07	0.508 (0.476)
Fixed Cost	941.69	941.18	0.618 (0.432)
Land Rental	517.20	510.20	**4.548 (0.034)****
Agricultural Equipment Depreciation	36.86	36.41	0.052 (0.820)
Investment Interest in Agricultural Equipment	3.31	3.32	0.065 (0.799)
Average Cost Before Yield	385.64	385.35	0.370 (0.543)

Variables	Mean by Class of Farm Size		F-test
	Smallholder	Large holder	(p-value)
Total Cost	6,951.47	6,951.77	0.843 (0.359)
Total Cost per kilogram	2.18	2.17	0.022 (0.882)
Available Cost per kilogram	1.89	1.85	0.721 (0.396)
Average Yield per Rai per Year	3,186.98	3,181.65	0.495 (0.482)
Average Price	3.38	3.39	0.152 (0.697)
Total Income per Rai per Year	10,805.31	10,779.54	0.288 (0.592)

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

6.5 The farmers' Perception and the Impact of the ASEAN Economic Community (AEC) on Oil Palm Producers in Thailand

The ASEAN Economic Community's goal was achieved in 2015, which stipulated that all 10 ASEAN member countries are the single market and production base with free movement of goods, services, investment, skilled labor, and the free movement of capital, to increase the competitiveness of ASEAN, as well as narrow the development gap between member countries and promote integration with the ASEAN community.

Thailand, especially businessmen and investors, will benefit from the use of natural resources, labor, and raw materials or semi-finished products from other ASEAN countries at a lower price and can move production bases or investments more conveniently as well as having the opportunity to expand trade and services more widely by creating alliances with operators in other countries to create competitive capability and collective bargaining power of the market until can use the convenient and cheaper logistics system as well. However, Thai people have the opportunity to buy goods and a variety of services at a fair price with better quality due to increased competition in the market, especially agricultural products.

The exportation of agricultural products and agribusiness between ASEAN countries to the ASEAN market and world markets will be very competitive. Major export economic crops such as rice, sugarcane, rubber, cassava, corn, and palm oil will be adversely affected. Especially small-scale farmers in all fields will be most affected because:

1) The agricultural sector in the country lacks development and innovation for a long time, causing the production efficiency to be lower than other countries and the lack of continuous upgrading of capability for the agricultural population, including most of the agriculture is in the elderly and lacking both labor and successor no agriculture causing upstream problems in agro-business.

2) Government policies are uncertain and continuous. Moreover, the market intervention policy causes agricultural products to lack the competitive capability in the world market, including production costs, labor costs, energy prices, and transportation costs, all higher than other countries, causing agro-business in the middle and downstream got competitive disadvantage with other countries

3) Other investors from both in ASEAN and outside the region come to seek more benefits in the Thai agricultural sector, such as buying land and hiring labor to do agriculture or contracting agricultural products, or doing business in a joint venture or nominee, causing small-scale farmers to lose more land and occupation.

Therefore, farmers at all levels must adapt to be aware of the changes by monitoring the production data of farmers in AEC member countries and marketing news, including consumer behavior, in order to consider production cost management and increase production efficiency and the quality of products. In particular, it is necessary to adapt to the product certification system and traceability in order to build up consumer confidence both domestically and internationally, as although the liberalization of trade in agricultural products and food will reduce tax barriers, but non-tax barriers is still can be stipulated, for example, phytosanitary conditions in which each country has regulations to protect consumers in their country.

Thai farmers need to adapt to the ASEAN free economy by creating opportunities and reducing the disadvantages of farmers by strengthening groups and networks of farmers in the form of community enterprises and agricultural cooperatives. This requires the combination of knowledge from research and wisdom by academic institutions and cooperation from local administrative organizations. It is very important to coordinate cooperation from all relevant agencies to assist small-scale farmers by speeding up the development of information systems of all relevant farmers in order to propose a policy guideline that supports the effects of the AEC.

Besides, research must be focused on research and development of innovative knowledge to increase production efficiency and quality of agricultural products for farmers, as well as clearly specifying economic zones that are consistent with production and marketing plans, as well as measures to protect agricultural areas, not to be used for any other purpose. At the same time, the logistics system should be improved to support the expansion of agricultural products to a broader market. Therefore, Thailand's strategy for the AEC and the global markets is to create a market with high-value products.

As for the entry into the AEC, many parties are concerned that oil palm is at risk of being severely affected if they cannot adapt to compete with large producers such as Malaysia and Indonesia in terms of price. However, entering into the AEC in Thailand may not be affected

much as Thailand continues to use measures to help the oil palm industry in the country by requiring government agencies such as Public Warehouse Organizations, is the only agency that imports palm oil at a 0 percent tax rate, allowing it to control the amount of palm oil imported from Malaysia and Indonesia. This also helps Thai palm oil mills to have time to develop their production potential, which, if crude palm oil mills can reduce production costs to the level of the world palm oil price equivalent to helping the palm oil refinery and Biodiesel plants have cheaper raw materials for production. This will increase the country's competitiveness and help domestic consumers to benefit from the reduced price as well.

From an interview, Mr. Somchai Prachabutr, the Deputy Manager of Krabi Oil Palm Farmers Cooperatives Federation, said that Thai investments in neighboring countries must be registered in the name of people in that country because of trade barriers and investment when free trade occurs. We have the potential not inferior to other countries, especially the oil palm, which is considered a miracle crop in Thailand more advanced than Malaysia.

“The competition is not scary because the nutritional value of palm oil that we export is higher than in Malaysia. It is about whether we publicize our advertisements well or not. In the age of competition in a world without borders, there is nothing more difficult than to find out what exactly we have to do. In the past, farmers lacked opportunities, but if there is an opportunity, I think that with brains and skills, we have the potential to compete with ASEAN or the world."

"There are a lot of social capitals that can compete with the world, like farmers who have to learn about knowledge to lead the development process. The process of understanding, accessing, and developing will move forward. This is important. Thai products will enter the world market, and we are not inferior to ASEAN countries. What is worrisome is that we have progressed far in this region, our costs are also higher. How to solve this problem is a problem that farmers and Thai people all over the country must help each other to answer."

6.5.1 The Farmers' Perception of the ASEAN Economic Community (AEC) on Oil Palm Producers in Thailand

Table 6.18 shows the perception of farmers in general about the impacts of the ASEAN Economic Community (AEC) on oil palm producers in Thailand in 5 dimensions, including the production system, the economic system, the social system, environmental, and food security. In production system found that farmers have strongly disagree with the increasing of skilled labor after Thailand entering the AEC because the labor in the agricultural sector is not included in the free labor moving policy between AEC countries. While they strongly agree that entering AEC will bring better opportunities in order to reach modern technology, increase oil palm varieties, and will decrease the cost of production factors. In the economic system, farmers strongly believe that entering AEC will increase income stability increase employment, more competition between local farms, ASEAN countries, and international competition under the AEC scheme. Furthermore, it will increase investment opportunities in oil palm production as well.

In the dimension of the social system, farmers strongly disagree that entering AEC will make more mobilization of labor and will create a better relationship in the community. while strongly agree that the prejudice in solving by the government will increase. About the environmental, farmers disagree that entering AEC will lead to the decrease in forest areas, increase soil problems, and as well as prolonged and severe floods, due to the increase of production. And the last dimension about food security, farmers strongly agree that entering AEC will help to increase purchasing power.

Table 6.18 The perception of farmers in general about the impacts of the ASEAN Economic Community (AEC) on oil palm producers in Thailand

Impacts	Mean
The production system	
Positive impacts	3.90
- Increase skilled labor	1.05
- Increase technology development	4.37
- Better opportunity to reach modern technology	4.60
- Increase oil palm varieties	4.76
- Decrease cost of production factors	4.74
Negative impacts	1.82
- Inequality of reaching the technology	2.98
- Lost the traditional practice	1.36
- Decrease the quality of production factors	1.11
The economics system	
Positive impacts	4.62
- Increase income stability	4.53
- Increase in employment	4.79
- Increase competition between local farm under the AEC scheme	4.61
- Increase competition between ASEAN countries under AEC scheme	4.62
- Increase international competition under the AEC scheme	4.66
- Increase of investment opportunities in oil palm	4.96
- Increase variety of agricultural activities	4.16
Negative impacts	2.87
- Price risk	4.62
- High investment cost	1.29
- Decrease investment opportunities in other activities	4.19
- Decrease additional household income from other activities	2.78
- Decrease variety of outside agriculture activity	1.48
-	
The social system	
Positive impacts	2.43
- Better livelihood quality	3.15
- Increase the establishment of farmer group	4.20
- More mobilization of labor	1.26
- Better relationship in the community	1.11
Negative impacts	4.11
- More inequality in society	4.00
- Increase prejudice in solving by the government	4.69
- Increase of crime in the community	3.26
- Increase conflicts between the government and local people	4.47

Impacts	Mean
Environmental	
Positive impacts	2.50
- Increase of green covered areas	4.33
- Increase the protection of forest fire	3.16
- Increase habitat for aquatic animals in ditches between oil palm rows	1.49
- High maintenance of soil fertility	1.00
Negative impacts	3.95
- Decrease in forest areas	4.75
- Increase soil problems	4.60
- Prolonged and severe floods	4.68
- Increase of pests	1.76
Food security	
Positive impacts	3.72
- Increase purchasing power	4.56
- Increase food area for the community	4.41
- Increase Variety of food sources from higher income	2.20
Negative impacts	1.74
- Loss possibility of growing food crops themselves	1.92
- Decrease Areas for production of food	1.46
- Decrease food area for the community	2.55
- Decrease Free food/ natural food	1.01

Source: From the study

Table 6.19 The perception of farmers classified by gender, age, education, and farm size about the impacts of the ASEAN Economic Community (AEC) on oil palm producers in Thailand

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
The production system									
Positive impacts	***3.90***	***3.94***	***3.92***	***3.89***	***3.91***	***3.90***	***3.94***	***3.91***	***3.90***
- Increase skilled labor	1.06	1.04	1.06	1.05	1.04	1.06	1.06	1.06	1.03
- Increase technology development	4.35	4.47	4.43	4.33	4.34	4.40	4.43	4.36	4.43
- Better opportunity to reach modern technology	4.57**	4.71**	4.61	4.60	4.65	4.56	4.63	4.62	4.55
- Increase oil palm varieties	4.76	4.77	4.78	4.74	4.76	4.76	4.80	4.76	4.76
- Decrease cost of production factors	4.74	4.73	4.73	4.75	4.76	4.71	4.80	4.74	4.73
Negative impacts	***1.82***	***1.84***	***1.79***	***1.85***	***1.80***	***1.85***	***1.76***	***1.83***	***1.81***
- Inequality of reaching the technology	2.98	3.00	2.96	3.01	2.94	3.03	3.00	3.00	2.95
- Lost the traditional practice	1.36	1.40	1.30	1.43	1.33	1.43	1.20	1.37	1.36
- Decrease the quality of production factors	1.11	1.13	1.10	1.12	1.13	1.10	1.09	1.11	1.11
The economics system									
Positive impacts	***4.61***	***4.67***	***4.63***	***4.61***	***4.64***	***4.60***	***4.67***	***4.62***	***4.63***
- Increase income stability	4.52	4.57	4.55	4.51	4.65***	4.40***	4.66***	4.51	4.64
- Increase in employment	4.77*	4.85*	4.76	4.82	4.78	4.80	4.80	4.78	4.82

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
- Increase competition between local farm under the AEC scheme	4.61	4.64	4.65	4.58	4.63	4.61	4.57	4.63	4.55
- Increase competition between ASEAN countries under AEC scheme	4.62	4.64	4.66	4.59	4.63	4.62	4.60	4.63	4.58
- Increase international competition under the AEC scheme	4.64**	4.75**	4.65	4.67	4.68	4.64	4.74	4.65	4.73
- Increase of investment opportunities in oil palm	4.96	4.98	4.98	4.95	4.96	4.97	5.00	4.98***	4.92***
- Increase variety of agricultural activities	4.13	4.27	4.15	4.17	4.16	4.15	4.29	4.16	4.16
Negative impacts	***2.87***	***2.89***	***2.88***	***2.88***	***2.88***	***2.88***	***2.83***	***2.88***	***2.88***
- Price risk	4.62	4.64	4.66	4.59	4.63	4.62	4.60	4.63	4.58
- High investment cost	1.30	1.28	1.26	1.33	1.30	1.31	1.23	1.32*	1.20*
- Decrease investment opportunities in other activities	4.16	4.27	4.15	4.23	4.20	4.19	4.11	4.17	4.26
- Decrease additional household income from other activities	2.80	2.73	2.80	2.77	2.80	2.76	2.83	2.78	2.82
- Decrease variety of outside agriculture activity	1.48	1.52	1.52	1.46	1.48	1.51	1.40	1.48	1.53
The social system									
Positive impacts	***2.15***	***2.15***	***2.16***	***2.14***	***2.14***	***2.15***	***2.38***	***2.16***	***2.12***
- Better livelihood quality	3.15	3.16	3.19	3.13	3.07	3.21	3.26	3.17	3.08

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
- Increase the establishment of farmer group	4.20	4.22	4.19	4.21	4.24	4.17	4.17	4.20	4.23
- More mobilization of labor	1.27	1.26	1.31**	1.22**	1.28	1.26	1.23	1.29*	1.19*
- Better relationship in the community	1.11	1.13	1.10	1.13	1.10**	1.10**	1.26**	1.12	1.08
Negative impacts	***4.10***	***4.14***	***4.07***	***4.15***	***4.13***	***4.06***	***4.27***	***4.10***	***4.14***
- More inequality of society	4.02	3.95	3.88**	4.12**	3.98**	3.93**	4.51**	3.98	4.09
- Increase prejudice in solving by the government	4.68	4.76	4.69	4.70	4.72	4.66	4.80	4.70	4.68
- Increase of crime in the community	3.27	3.22	3.27	3.25	3.35	3.20	3.11	3.25	3.32
- Increase conflicts between the government and local people	4.42**	4.63**	4.43	4.51	4.48	4.43	4.66	4.48	4.46
Environmental									
Positive impacts	***2.21***	***2.36***	***2.19***	***2.20***	***2.21***	***2.18***	***2.26***	***2.20***	***2.19***
- Increase of green covered areas	4.32	4.38	4.36	4.31	4.31	4.32	4.43	4.33	4.32
- Increase protection of forest fire	3.23*	2.94*	3.15	3.17	3.16	3.12	3.46	3.15	3.22
- Increase habitat for aquatic animals in ditches between oil palm rows	1.51	1.46	1.45	1.54	1.57	1.44	1.43	1.52	1.41
- High maintenance of soil fertility	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Negative impacts	***3.95***	***3.97***	***3.94***	***3.96***	***3.94***	***3.96***	***3.97***	***3.97***	***3.90***
- Decrease of forest areas	4.75	4.75	4.73	4.77	4.76	4.75	4.71	4.77	4.68
- Increase soil problems	4.59	4.63	4.59	4.61	4.59	4.60	4.66	4.61	4.57
- Prolonged and severe floods	4.67	4.74	4.69	4.68	4.67	4.70	4.69	4.70	4.64

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
- Increase of pests	1.77	1.76	1.76	1.77	1.72	1.79	1.83	1.78	1.70
Food security									
Positive impacts	***3.72***	***3.75***	***3.72***	***3.73***	***3.71***	***3.73***	***3.80***	***3.74***	***3.68***
- Increase purchasing power	4.55	4.63	4.58	4.55	4.55	4.56	4.66	4.58	4.49
- Increase food area for the community	4.39*	4.50*	4.40	4.43	4.41	4.39	4.57	4.42	4.41
- Increase Variety of food sources from higher income	2.22	2.13	2.19	2.21	2.18	2.23	2.17	2.21	2.15
Negative impacts	***1.75***	***1.73***	***1.75***	***1.74***	***1.75***	***1.73***	***1.78***	***1.73***	***1.77***
- Loss possibility of growing food crops themselves	1.91	1.96	1.97*	1.88*	1.94	1.90	1.94	1.91	1.97
- Decrease Areas for production of food	1.47	1.45	1.46	1.47	1.47	1.46	1.51	1.44*	1.57*
- Decrease food area for the community	2.58	2.50	2.54	2.58	2.56	2.54	2.60	2.56	2.55
- Decrease Free food/ natural food	1.02	1.00	1.01	1.02	1.01	1.01	1.06	1.02	1.00

Source: From the study

*** 99 percent confidence level
** 95 percent confidence level
* 90 percent confidence level

Table 6.19 shows the perception of farmers classified by gender, age, education, and farm size about the impacts of the AEC on oil palm producers in Thailand. Found that male and female have the different level of perception the impacts of the AEC on oil palm producers in Thailand in better opportunity to reach modern technology, increase in employment, increase international competition under the AEC scheme, increase conflicts between the government and local people, increase protection of forest fire, and increase food area for the community.

The differentiate of age shows that it makes the difference in the perception about more mobilization of labor, more inequality of society, and the loss of the possibility of growing food crops themselves after the country entering the AEC. While the level of education makes the difference of the perception in the dimension of increase income stability, better relationship in the community, and more inequality of society. Smallholders and large holders have a different perception of the increase of investment opportunities in oil palm, high investment cost, more mobilization of labor, and a decrease of areas to produce food.

6.5.2 The Impact of the ASEAN Economic Community (AEC) on Oil Palm Producers in Thailand

From the table 6.20 shows that the economic impact is the most prominent positive impact (0.465) of the ASEAN Economic Community (AEC) on oil palm producers in Thailand, followed by the production system (0.243), food security (0.176), environmental (0.067) and social system is the last one (0.049), respectively.

And the result also shows that the first negative impact of the AEC on oil palm producers in Thailand is the social system (0.429), followed by the environmental (0.327), the economics system (0.141), the production system (0.059), and food security (0.045), respectively.

Agricultural activities are a mainstay of local people, but they are deprived of land acquisition. The royal forest department supervises land rights. Unclear land property rights and lack of transparency lead to inequitable outcomes and quality of life. Moreover, they cause conflicts between government officials and local people, which are still extensive and tend to be centered on compensation for lost land access issues. At the same time, the main problems in the area are not still sincerely solved by government officials though they perceive these problems well, and another problem is stealing oil palm bunches in the area.

Typically, the prices of oil palm are unstable due to seasonality in demand and supply, and marketing, or a combination of two. As a result, oil palm producer faces the risk of income unsteadiness. In 2015, the establishment of the AEC may cause oil palm producers in Thailand are unable to compete both in production and marketing with Indonesian and Malaysian oil palm producers, whose being leading producers and exporters in the world market because the cost of oil palm production in Thailand is comparatively higher than Indonesia and Malaysia. Consequently, oil palm producers in Thailand will be adversely affected by trade liberalization and price risks in the future.

Regarding the study of the impact of the AEC on oil palm producers in Thailand which classified with gender, age, class of education, and farm size (table 6.21), found that there is no difference in the farmers' perception about the impact and the result is showing the same with the general farmers' perception. For the positive impact, found that the economic impact is the most prominent positive impact of the AEC on oil palm producers in Thailand, followed by the production system, food security, while environmental and social system are the last ones, respectively. And the result also shows that the first negative impact of the AEC on oil palm producers in Thailand is the social system, followed by the environment, the economic system, the production system, and food security, respectively.

Table 6.20 The general identification of positive impacts and negative impacts of the ASEAN Economic Community (AEC) on oil palm producers in Thailand

Positive impacts (AHP Scores)	Negative impacts (AHP Scores)
The production system (0.243) - Increase skilled labor (0.026) - Increase technology development (0.149) - Better opportunity to reach modern technology (0.203) - Increase oil palm varieties (0.354) - Decrease cost of production factors (0.268)	**The production system (0.059)** - Inequality of reaching the technology (0.709) - Lost the traditional practice (0.179) - Decrease the quality of production factors (0.113)
The economics system (0.465) - Increase income stability (0.081) - Increase in employment (0.203) - Increase competition between local farm under the AEC scheme (0.115) - Increase competition between ASEAN countries under AEC scheme (0.115) - Increase international competition under the AEC scheme (0.166) - Increase of investment opportunities in oil palm (**0.261**) - Increase variety of agricultural activities (0.059)	**The economics system (0.141)** - Price risk (0.465) - High investment cost (0.036) - Decrease investment opportunities in other activities (0.319) - Decrease additional household income from other activities (0.130) - Decrease variety of outside agriculture activity (0.049)
The social system (0.049) - Better livelihood quality (0.260) - Increase the establishment of farmer group (0.616) - More mobilization of labor (0.075) - Better relationship in the community (0.050)	**The social system (0.429)** - More inequality of society (0.155) - Increase prejudice in solving by the government (**0.449**) - Increase of crime in the community (0.077) - Increase conflicts between the government and local people (0.318)
Environmental (0.067) - Increase of Green covered areas (0.611) - Increase Protection of forest fire (0.260) - Increase habitat for aquatic animals in ditches between oil palm rows (0.084) - High maintenance of soil fertility (0.045)	**Environmental (0.327)** - Decrease of forest areas (0.441) - Increase soil problems (0.214) - Prolonged and severe floods (0.303) - Increase of pests (0.042)
Food security (0.176) - Increase purchasing power (0.567)	**Food security (0.045)**

Positive impacts (AHP Scores)	Negative impacts (AHP Scores)
- Increase food area for the community (0.357) - Increase Variety of food sources from higher income (0.075)	- Loss possibility of growing food crops themselves (0.234) - Decrease Areas for production of food (0.157) - Decrease food area for the community (0.526) - Decrease Free food/ natural food (0.083)

Source: From the study

Table 6.21 Identification of positive impacts and negative impacts of the ASEAN Economic Community (AEC) on oil palm producers in Thailand, classified by gender, age, education, and farm size

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
The production system									
Positive impacts	***0.236***	***0.236***	***0.236***	***0.236***	***0.236***	***0.236***	***0.236***	***0.236***	***0.236***
- Increase skilled labor	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
- Increase technology development	0.149	0.153	0.149	0.149	0.149	0.149	0.149	0.149	0.149
- Better opportunity to reach modern technology	0.203	0.202	0.203	0.203	0.203	0.203	0.203	0.203	0.203
- Increase oil palm varieties	0.354	0.352	0.354	0.354	0.354	0.354	0.354	0.354	0.354
- Decrease cost of production factors	0.268	0.267	0.268	0.268	0.268	0.268	0.268	0.268	0.268
Negative impacts	***0.062***	***0.050***	***0.050***	***0.062***	***0.050***	***0.062***	***0.062***	***0.050***	***0.062***
- Inequality of reaching the technology	0.709	0.709	0.709	0.709	0.709	0.709	0.709	0.709	0.709
- Lost the traditional practice	0.179	0.179	0.179	0.179	0.179	0.179	0.179	0.179	0.179
- Decrease the quality of production factors	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.113	0.113
The economics system									
Positive impacts	***0.467***	***0.469***	***0.469***	***0.467***	***0.469***	***0.467***	***0.467***	***0.469***	***0.467***
- Increase income stability	0.081	0.104	0.081	0.087	0.142	0.081	0.142	0.104	0.104
- Increase in employment	0.204	0.206	0.204	0.205	0.206	0.204	0.206	0.206	0.206

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
- Increase competition between local farm under the AEC scheme	0.133	0.104	0.133	0.116	0.095	0.133	0.095	0.104	0.104
- Increase competition between ASEAN countries under AEC scheme	0.133	0.104	0.133	0.116	0.095	0.133	0.095	0.104	0.104
- Increase international competition under the AEC scheme	0.133	0.1689	0.133	0.167	0.150	0.133	0.150	0.1689	0.1689
- Increase of investment opportunities in oil palm	0.262	0.253	0.262	0.250	0.252	0.262	0.252	0.253	0.253
- Increase variety of agricultural activities	0.053	0.060	0.053	0.059	0.060	0.053	0.060	0.060	0.060
Negative impacts	***0.132***	***0.140***	***0.140***	***0.132***	***0.140***	***0.132***	***0.132***	***0.140***	***0.132***
- Price risk	0.467	0.467	0.467	0.467	0.467	0.467	0.467	0.467	0.467
- High investment cost	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038	0.038
- Decrease investment opportunities in other activities	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320	0.320
- Decrease additional household income from other activities	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
- Decrease variety of outside agriculture activity	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
The social system									
Positive impacts	***0.051***	***0.058***	***0.058***	***0.051***	***0.058***	***0.051***	***0.051***	***0.058***	***0.051***
- Better livelihood quality	0.260	0.287	0.287	0.252	0.287	0.252	0.252	0.270	0.252

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
- Increase the establishment of farmer group	0.616	0.584	0.584	0.619	0.584	0.619	0.619	0.610	0.619
- More mobilization of labor	0.075	0.078	0.078	0.070	0.078	0.070	0.070	0.049	0.070
- Better relationship in the community	0.050	0.051	0.051	0.052	0.051	0.052	0.052	0.071	0.052
Negative impacts	***0.433***	***0.432***	***0.432***	***0.433***	***0.432***	***0.433***	***0.433***	***0.432***	***0.433***
- More inequality of society	0.184	0.139	0.139	0.184	0.139	0.184	0.184	0.139	0.184
- Increase prejudice in solving by the government	0.464	0.320	0.320	0.464	0.320	0.464	0.464	0.320	0.464
- Increase of crime in the community	0.097	0.086	0.086	0.097	0.086	0.097	0.097	0.086	0.097
- Increase conflicts between the government and local people	0.254	0.455	0.455	0.254	0.455	0.254	0.254	0.455	0.254
Environmental									
Positive impacts	***0.068***	***0.058***	***0.058***	***0.068***	***0.058***	***0.068***	***0.068***	***0.058***	***0.068***
- Increase of green covered areas	0.610	0.644	0.610	0.610	0.610	0.610	0.610	0.610	0.610
- Increase protection of forest fire	0.260	0.220	0.260	0.260	0.260	0.260	0.260	0.260	0.260
- Increase habitat for aquatic animals in ditches between oil palm rows	0.084	0.089	0.084	0.084	0.084	0.084	0.084	0.084	0.084
- High maintenance of soil fertility	0.045	0.047	0.045	0.045	0.045	0.045	0.045	0.045	0.045
Negative impacts	***0.328***	***0.327***	***0.327***	***0.328***	***0.327***	***0.328***	***0.328***	***0.327***	***0.328***
- Decrease of forest areas	0.439	0.454	0.454	0.439	0.454	0.439	0.439	0.454	0.439
- Increase soil problems	0.258	0.143	0.143	0.258	0.143	0.258	0.258	0.143	0.258
- Prolonged and severe floods	0.258	0.325	0.325	0.258	0.325	0.258	0.258	0.325	0.258
- Increase of pests	0.045	0.078	0.078	0.045	0.078	0.045	0.045	0.078	0.045

Impacts	Gender		Age		Education			Farm size	
	Male	Female	Young Farmer	Old Farmer	None or primary	Secondary and High School	Graduate and above	Smallholder	Large holder
Food security									
Positive impacts	***0.179***	***0.179***	***0.179***	***0.179***	***0.179***	***0.179***	***0.179***	***0.179***	***0.179***
- Increase purchasing power	0.567	0.567	0.567	0.567	0.567	0.567	0.567	0.567	0.567
- Increase food area for the community	0.357	0.357	0.357	0.357	0.357	0.357	0.357	0.357	0.357
- Increase Variety of food sources from higher income	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075
Negative impacts	***0.045***	***0.050***	***0.050***	***0.045***	***0.050***	***0.045***	***0.045***	***0.050***	***0.045***
- Loss possibility of growing food crops themselves	0.218	0.237	0.237	0.218	0.237	0.218	0.218	0.237	0.218
- Decrease Areas for production of food	0.145	0.141	0.141	0.145	0.141	0.145	0.145	0.141	0.145
- Decrease food area for the community	0.534	0.531	0.531	0.534	0.531	0.534	0.534	0.531	0.534
- Decrease Free food/ natural food	0.102	0.091	0.091	0.102	0.091	0.102	0.102	0.091	0.102

Source: From the study

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Regarding the first and second objective about to characterize an oil palm sector in Thailand, ASEAN, and the world. And to characterize a sample of oil palm producers in Thailand, which using secondary data, found that oil palm is considered one of the important economic crops for Thai farmers, especially in the southern region, which also gives Thailand a strength in food security (vegetable oil). The refined palm oil in Thailand is considered to have a high standard of production when compared to the major oil palm and palm oil-producing countries in the world, as it has more transparent color and free of sediment and wax.

Furthermore, the study also found that factors affecting the oil palm plantation in Thailand are including: (1) the gender has a profound impact on marital status, total family member, farm size, source of money for investment on oil palm plantation, harvesting cost, and total cost per kilogram of oil palm (2) the class of age influences the source of money to invest on oil palm plantation, total household income, the cost of agricultural material and supplies, and fixed cost on oil palm plantation (3) the class of education influences on farm size, total family member that is working on oil palm production, the input cost, the agricultural equipment repair, and the total cost per kilogram of oil palm plantation (4) the class of farm size influences on total farm income, total production of oil palm, and land rental cost.

As for the obligation to open the palm oil products market under the AEC, Thailand has to reduce the import tax on crude palm oil and refined palm oil to 0 percent by requiring the Public Warehouse Organization (PWO) as an only government agency to import palm oil. Currently, the government, with the Public Warehouse Organization (PWO), has imported palm oil from Malaysia periodically, significantly affecting oil palm producers in Thailand because crude palm oil from neighboring countries is cheaper than crude palm oil in Thailand. May be partially due to the government policy to guarantee the price of fresh fruit bunches for domestic farmers, resulting in the cost of crude palm oil production of the Thai CPO factory is higher than the crude palm oil from Malaysia. Therefore, the reduction of import tax on palm oil has an inevitable impact on the production of oil palm and palm oil, all upstream, midstream, and downstream industries. Especially oil palm farmers, crude palm oil mill, refined palm oil refinery, and domestic consumers in the sense that they will face a shortage and higher price of refined palm oil, as the Ministry of Commerce has a policy that not allow

the domestic refined palm oil to increase the price according to the increased production costs.

In addition, it is more difficult for Thailand to develop oil palm varieties to compete with Malaysia and Indonesia because Thai farmers are small-scale farmers, lacking effective management and policies to support. While both countries have large-scale palm plantations through proper management, and the government does not strictly protect the palm oil industry. Therefore, it can be said that Thai palm oil is a product that is very risky if the tax is reduced to 0 percent and open for free imports.

In order to answer the third objective about the impact on oil palm producers from entering the AEC by using Analytic Hierarchy Process (AHP) found that the establishment of the AEC conducts a trade-off between positive and negative impacts among different stakeholders to which the Royal Thai government needs to pay attention to them. This research result summarizes that economic impacts are the most critical positive impacts, whereas social impacts are the most significant negative impacts, which is different from the hypothesis of the study that the most negative impact would be environmental.

The results from the study lead to answer the last objective of the study. The suitable ways to improve the competitiveness of oil palm producers in Thailand after entering the AEC is that the Royal Thai Government, Ministry of Commerce, Ministry of Agriculture and Cooperative, and other related sectors should be able to ensure that the oil palm producer can get fair trade (price and cost) to be able to have a stable income, reduce the risk of unstable price, the small producer can get quickly to subsidy (more equality). What Thailand needs to be prepared for this is to increase the productivity of fresh fruit bunches and palm oil to be higher than in Malaysia and Indonesia. The critical thing to do is that to have good oil palm varieties that are suitable for the environment in Thailand, the knowledge of production, technology, which may need to use performance control of palm oil extraction and distillation factory, including the environment in the factory more effectively.

7.2 Recommendations

From the study, in order to increase the production and marketing potential of Thai oil palm production in entering the ASEAN Economic Community (AEC), Thailand should have the following preparation measures:

1. Production that needs to strengthen production of palm oil in Thailand for more efficiency such as low production costs, high yield per Rai, better quality product, consistent yield, by relying on experts to help on research and development of palm varieties that have a better quantity of yield and oil that is equivalent to the production of large manufacturers, and disseminate support for farmers to be able to actually produce oil palm.

(1) Transfer knowledge to farmers in the management of palm plantations, including fertilizer application based on soil and leaf analysis values, good practice in foliar trimming, harvesting of ripe palm fruit which has a high oil percentage, and proper post-harvest management, including the promotion of standardized palm oil production according to RSPO, which will help to reduce the cost of palm oil production.

(2) Promote and support the use of good palm species and sufficient to farmers' demand.

(3) The government should support the expense of soil and leaf analysis, the proper fertilizer application for oil palm trees to get enough nutrients will increase the efficiency of chemical fertilizer use and help to increase the income for farmers.

(4) Promote and develop research personnel for the development of oil palm and palm oil industry, as well as continuously develop the process of transferring palm oil technology to producers.

(5) Increase oil palm plantations in suitable areas under the policy of the Ministry of Agriculture and Cooperatives and modify oil palm plantation in the inappropriate area to conform with the country's oil palm and palm oil strategic plans. Although Thailand is currently the world's top producer of oil palm and palm oil, and sufficient for domestic consumption, but expanding the cultivated area in the appropriate land is also an essential strategy that the relevant agencies must push it to be more concrete, to support the consumption and to be used as alternative energy in the future, including production expansion to neighboring countries in areas that have appropriate potential.

(6) Promote the integration of production and marketing of oil palm, strengthening farmers and farmers' institutions to link with the private sector to ensure the quality of palm oil production and to have stable palm oil prices.

2. Marketing

(1) Define fair purchasing criteria for oil palm and determine purchase price according to the level of oil palm quality, including bringing additional benefits such as sharing income from palm kernel with farmers or for farmers who cut ripe palm as an incentive.

(2) Determine the single purchase price of palm oil in the market and set the price according to the market mechanism.

(3) Increase ways to use palm oil and palm oil-based products such as chemical, pharmaceutical, cosmetic industries, or use palm oil to generate electricity, in order to create market and price stability.

(4) Continuously support the use of alternative energy from oil palm instead of fossil fuels following the potential of domestic oil palm and palm oil production.

(5) Negotiating or creating cooperation with the leader oil palm producing countries in ASEAN regarding the quality of standardized palm oil and joint products (ASEAN Sustainable Palm Oil (ASPO), as well as pushing the production of oil palm and palm oil under ASPO standards or RSPO standards.

(6) Supporting the determination of marketing policy for oil palm and palm oil-based products in accordance with the market mechanism that creates competition and distributes benefits thoroughly and fairly to all involved parties.

3. Management strategy is the most essential for oil palm and palm oil production development, as same as the Malaysian Palm Oil Board (MPOB). Even though Thailand has the National Palm Oil Policy Committee, but the operation has not progressed that much. It is necessary to have a national committee to manage the development of oil palm and palm oil, from the production of the farmers until the final product, to create unity in the development of Thai palm oil to be sufficient of the country's demand in terms of food and energy, and ultimately, to be a source of income for Thailand as well.

(1) Establish the Management Information System (MIS) and Geographic Information System (GIS) related to oil palm for the management, production, marketing with the standards that are acceptable, mutual, and up to date.

(2) Oil palm ramp quality should be monitored and controlled to operate in accordance with standards in order to screen the produce from the source purchase before shipping to the extraction plant, which can be another mechanism for developing the right harvest in oil palm.

(3) Establish infrastructure and logistic systems that are conducive to the oil palm industry, such as transporting fresh fruit brunch from oil palm plantations to the crushing plant within 24 hours and better quality of oil storage tanks.

(4) Accelerate the application of palm oil standards and palm oil-based products in accordance with international standards.

(5) Continuously supporting research and extension to create new products or production technology for producing high-value products.

(6) Grouping or integration strategy for farmers or producers strengthening. This strategy is to promote the integration of oil palm farmers, palm oil mills, and continuous industries. In order to strengthen the bargaining power, which most of them are small-scale farmers, and including creating price stability, production cost stability, and better quality of raw materials, which will result in increased competitiveness.

4. Research and development, especially to create additional value, since oil palm and palm oil are beneficial products. It can be used in a wide range of industries, both the food industry, processed food, renewable energy industry, and the oleochemical industry. Therefore, related agencies, both government and private sector that supervises oil palm policy must promote and accelerate the development of continuous and severe development.

(1) Develop equipment for measuring oil content in palm fruit.

(2) Machinery and equipment that help harvest oil palm fresh fruit bunch, including the transportation of oil palm fresh fruit bunches from the planting area to the factory in order to reduce transportation costs.

(3) An effective method of evaluating the quality of oil palm fresh fruit bunches for fair trading.

(4) Increasing efficiency and reducing losses in palm oil extraction systems, including the development of high-performance and environmentally friendly in palm oil processing technology.

(5) Palm oil extraction technology at the community level for good quality of palm oil production and environmentally friendly.

(6) Research and development of oil palm varieties with high yield and weather resistance.

(7) Developing and adding value to waste materials in palm plantations, such as oil palm trees or foliar palm.

(8) Focusing on the research about the potential of the country to run an ongoing business of oil palm into Oleochemicals, to increase the value of oil palm and palm oil in the future.

7.3 Limitations

The limitations in conducting this research are the delay in collecting secondary data because there is a need to contact the government to request formal and accurate information, which has many steps and is complicated. Anyway, information searching through the internet is also possible, but for the most part, the information will not be updated and the language limitations as this thesis compare the data of countries that are members of the AEC which use different languages. Including budget constraints, which make it impossible to travel to different countries to find missing information or conduct in-depth studies

Besides, this thesis takes quite a long time to study and during the study, there was the formal entry into the AEC and changes in government policies regarding palm oil production in many dimensions, resulting this study cannot cover the effects of the new policies, so there are limitations in applying the results in current situations.

7.4 Future Research

As mentioned above, the changes in situations and policies can occur at any time. Future research should have to consider the impact after entering the ASEAN Economic Community (AEC). There is also a big issue after the European Union (EU), one of the largest importers. Announcement of measures "zero palm oil" to stop using palm oil by 2020-2021 and restrict the use of palm oil in the production of biofuels which will have a severe impact on the palm oil and oil palm producing countries.

REFERENCE

ASEAN Secretariat. 1999. **ASEAN plus three cooperation**. Retrieved April 12, 2017, from http://www.aseansec.org/16580.html

Association of Southeast Asia Nation. 2008. **ASEAN ECONOMIC COMMUNITY BLUEPRINT**. Jakarta: ASEAN secretariat.

_____. 2012. **ASEAN Economic Community Handbook for Business 2012**. Jakarta: ASEAN secretariat.

_____. 2019. **The total population of the ASEAN countries**. Retrieved September 21, 2019. https://www.statista.com/statistics/796222/total-population-of-the-asean-countries/

Balassa, B. 1961. **The theory of economic integration**. Homewood, IL: Richard D. Irwin.

Bureau of Agricultural Economics Research. 2016. **The study of Oil palm products to support the ASEAN Economic Community Case study: Republic of Indonesia And Malaysia Federation.** Office of Agricultural Economics. Bangkok.

Bergsten, F. 2009. **Open regionalism**. Retrieved April 15, 2017, from http://www.iee.com/ publications/wp/wp.cfm?ResearchID=152

BPS-Statistics Indonesia. 2019. **Indonesia Oil Palm Statistics**. Retrieved December 2, 2019, from https://www.bps.go.id/index.php/Publikasi

Breslin, S. 2007. **Theorising East Asian regionalism(s)**. In M.G. Curley & N. Thomas (Eds) (pp. 29-40). Advancing East Asian regionalism. London: Routledge.

Bunprasert, P. 1992. **Effect of the agreement on free trade area to economic law: palm oil industry and related industry**. Chulalongkorn University, Bangkok.

Center for International Trade Studies. (2011). **An Analysis: "After One Year of the ASEAN Economic Community, what is Thailand's Status in the ASEAN Market?".** Thailand Economics and Business Review Journal. Volume 4 Issue 1 JUNE - AUGUST 2011, pages 9-13.

Chatzimouratidis, A.I., and Pilavachi, P.A. 2008. **Multicriteria evaluation of power plants impact on the living standard using the analytic hierarchy process**. Energy Policy 36 (2008), pages 1074–1089.

Chavananand, K. 2011. **Future of Thai Palm Oil Industry**. Palmex Thailand 2011 Conference. September 8, 2011.

Cheewatrakoolpong, K., Sabhasri, C., and Bunditwattanawong, N. 2013. **Impact of the ASEAN Economic Community on ASEAN Production Networks**. Asian Development Bank Institute, Japan.

Chotisakul, S. 1998. **Academic papers on oil palm**. Department of Agriculture Extension. Ministry of Agriculture Cooperatives, Thailand.

Cooperative Support Department. 2019. **Agricultural Production Structure Adjustment Fund (FTA)**. Retrieved November 25, 2019. From http://office.cpd.go.th/supportcoop /index.php/2016-05-31-02-42-17/fta

CPI Agrotech. 2017. **Oil production from different crops in Thailand**. Retrieved January 28, 2017. http://www.cpiagrotech.com/knowledge-002/

_____. 2017. **Oil Palm Planting: planting distance between oil palm that give the highest yield, what should be?**. Retrieved January 28, 2017. From http://www.cpiagrotech .com/knowledge-041/

_____. 2017. **How many species of oil palm are there? What species? How are each species different?**. Retrieved January 28, 2017. From http://www.cpiagrotech.com/know ledge-015/

Cumbers, A. 2009. **Regional Integration. International Encyclopedia of Human Geography**. Pages 252–258

Dallinger, J. 2011. **Oil Palm Development in Thailand: Economic, Social and Environmental Considerations. In Oil Palm Expansion in South East Asia: Trends and Implications for Local Communities and Indigenous Peoples**. Forest Peoples Programme and Perkumpulan Sawit Watch.

Department of Agriculture. 2005. **Oil palm technical documents**. Ministry of Agriculture and Cooperative. Bangkok.

_____. 2019. **Oil palm to palm oil to AEC**. Retrieved September 21, 2019. From http://doa.go.th/pibai/pibai/n16/v_9-oct/korkui.html

Department of Agriculture Extension. 2016. **The situation of Oil palm in Thailand**. Ministry of Agriculture Cooperatives, Thailand.

Department of European Affair. 2019. **European Union (EU).** Retrieved May 22, 2019. From https://bit.ly/2pSfZXy

Department of Foreign Trade. 2011. **AEC Factbook**. Ministry of Commerce, Thailand.

Department of Internal Trade. 2011. **Production and marketing of palm oil**. Ministry of Commerce, Thailand.

_____. 2016. **Oil palm and palm oil strategy reform for the entire system for 20 years (2016-2036)**. Ministry of Commerce, Thailand.

Economic and Industry Development Division. 2014. **Palm Oil and Rubber Annual Report 2014.** Malaysian Palm Oil Board.

Eksomtramage, T. 2014. **Oil palm in ASEAN: Getting to know YOURSELF**. The Thailand Research Fund. Thailand.

Elkarni, F. and Mustafa, I. 1993. **Increasing the utilization of solar energy technologies (SET) in Jordan: Analytic Hierarchy Process**. Energy Policy 21, pages 978–984.

ETH Zurich. 2019. **KOF Globalisation Index**. Retrieved November 25, 2019. from https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html

Falk, R. 1967. **Regional politics and word order**. San Francisco: W.H. Freeman and Company.

FAO. 2012. **Smallholder and family farmers**. Fact sheet.

_____. 2015. **Agricultural transformation of middle-income Asian economies: Diversification, farm size, and mechanization**. ESA Working Paper No. 15-04. Rome

Fawn, R. 2009. **Globalising the regional: the global**. Cambridge, England: Cambridge University Press.

Food Network Solution. 2018. **Structure and composition of oil palm**. Retrieved April 20, 2018. From https://bit.ly/2qNvgcH

Friedman, T. L. 2007. **The World is Flat: A brief history of the twenty-first century**. New York: Pan Books.

Gan, P.Y. and Z.D, Li. 2014. **Econometric study on Malaysia's palm oil position in the world market to 2035**. Renewable and Sustainable Energy Reviews, 39 (2014), pages 740–747.

Garnaut, R. 2004. **A new open regionalism**. Retrieved March 22, 2017, from http://www. Lowyinstitute.org/filles/publfiles/Garnaut,_A_New_Open_Regionalism_in_the_Asia _Pacific.pdf

George, S. 1999. **A short history of neoliberalism: Conference on economic sovereignty in globalizing world**. Retrieved March 15, 2017, from http://www.globalpolicy.org/ globaliz/econ/histneol.htm

Goldstein, D. (Ed.). 1994. **Classic reading of international relations**. Belmont, CA: International Thomson.

Greenstein, F. I. 1975. **HANDBOOK OF POLITICAL SCIENCE**. Addison-Wesley Publishing Company, Reading, Mass., 8 volumes.

Grochowska, R. and Kosior, K. 2013. **Agricultural policies in the context of regional and global food security concerns – the case of the Asian region**. Problems of World Agriculture / Problemy Rolnictwa Światowego, 2013, Vol.13 (28), pages 25-33.

Henan DOING Mechanical Equipment Co., Ltd. 2015. **What is the difference between palm oil and palm kernel oil?**. Retrieved April 20, 2018. http://www.palmoilextraction machine.com/FAQ/palm_oil_mill261.html

Huizingh, K.R.E. and Virolijk, H.C.J. 1994. **A framework for comparing project selection methods**. In research report of the research institute system, organization and management, n.p.

Hurrell, A. 2007. **One World? Many Worlds? The place of regions in the study of international society**. Martin Wright Lecture 2006. International Affairs, 83, pages 151-166

Index Mundi. 2013**. Palm Oil Production by Country in 1000 MT**. Retrieved August 16, 2013. Fromhttp://www.indexmundi.com/agriculture/?commodity=palmoil&graph=produc tion

Jankowski, J. 2017. **Hierarchical structure in the analytic hierarch process (AHP) method.** Retrieved September 24, 2017. https://www.researchgate.net/figure/Hierarchical-structure-in-the-analytic-hierarch-process-AHP-method-Comparison of_fig1_305678199

Jittasevi, K. 2009. **International organizations**. Bangkok, Winyuchon.

Jones, D.M, &Smith, M. L. R. 2006. **Asean and East Asian international relations: Regional delusion**. Northampton, MA: Edward Elqar.

Julpanont, W. 2012. **The development of the ASEAN Economic**. Ramkhamhaeng University.

KASIKORN Research Center Company Limited. 2014. **Oil palm business after AEC**. Retrieved September 4, 2014. From https://bit.ly/2Plba3N

Khanpanat, N. 2013. **Dried longan entrepreneurs' attitudes in Chiang Mai and Lamphun Provinces towards the establishment of the ASEAN Economic Community 2015**. Chiang Mai University, Chiang Mai.

Kim, N. K. (Ed.). 2009. **Globalization and regional integration in Europe and Asia**. Aldershot, England: Ashgate.

Kittisenachai, P. 2016. **Palm oil when entering the AEC**. Trade policy and strategy office, Ministry of commerce. Bangkok.

Land Development Department. 2013. **Oil palm production area in Thailand**. Retrieved September 4, 2014. From http://sql.ldd.go.th/intraaccount/Zoning/Area_palm.pdf

Lee, C. and Fukunaga, Y. (2014). **ASEAN regional cooperation on competition policy**. Journal of Asian Economics 35, pages 77-91.

Lee, H. and Plummer, M.G. 2011. **Assessing the Impact of the ASEAN Economic Community**. Osaka School of International Public Policy, Osaka University

Lowder S., J. Skoet., and T. Raney. 2016. **The number, size, and distribution of farms, smallholders farms, and family farms worldwide**. World development Vol. 87: 16-29.

Malaysian Palm Oil Board. 2019. **Malaysian Oil Palm Statistics**. Retrieved December 2, 2019, http://bepi.mpob.gov.my/index.php/en/

Ministry of Agriculture and Cooperatives. 2012. **Oil palm and palm oil industry development plan 2013-2017.** Bangkok.

_____. 2013. **The opportunity of Thai agricultural products to the ASEAN Economic Community.** Office of Agricultural Economics. Bangkok.

Ministry of Commerce. 2019. **List of export-import goods and services between Thailand and ASEAN countries year 2018**. Retrieved September 22, 2019. http://tradereport.moc.go.th/TradeThai.aspx

_____. 2019. **Thailand's export destination**. Retrieved September 22, 2019. http://tradereport.moc.go.th/TradeThai.aspx

Morocco World News. 2018. **Morocco's Adheres to ASEAN Treaty of Amity and Cooperation**. Retrieved January 8, 2018. https://www.moroccoworldnews.com/2016/07/192346/moroccos-adheres-asean-treaty-amity-cooperation/

Muangchan, K. 2000. **ASEAN Free Trade Area: The Impact on Thai Textile Industry**. Ramkhamhaeng University. Bangkok.

N. Permpool et al. 2015. **Greenhouse gas emissions from land use change due to oil palm expansion in Thailand for biodiesel production**. Journal of Cleaner Production xxx (2015), pages 1-7.

O'Connora, T.G. and Kuylerb, P. 2009. **Impact of land use on the biodiversity integrity of the moist sub-biome of the grassland biome, South Africa**. Journal of Environmental Management, Volume 90, Issue 1, Pages 384–395

Office of Agricultural Economics. 2015. **Oil palm: Cultivated area, harvested area, total products, and average product in Thailand year 2012-2014**. Ministry of Agriculture Cooperatives, Thailand.

Office of Agricultural Products Trade Promotion. 2014. **Palm oil industry system in Thailand**. Department of Internal Trade.

Office of the National Economic and Social Development Council. 2019. **Southern Development Plan.** Retrieved September 6, 2019. https://www.nesdb.go.th/ewt_dl_link.php?nid=8537&filename=index

Okada, H. Styles, H.W. Grismer, M.E. 2008. **Application of the Analytic Hierarchy Process to irrigation project improvement Part I. Impacts of irrigation project internal processes on crop yields**. Agricultural water management 95, pages 199-204.

Opasanon, S. and Lertsanti, P. 2013. **Impact analysis of logistics facility relocation using the analytic hierarchy process (AHP)**. International Transactions in Operational Research, 2013, Vol.20 (3), pages 325-339.

Petri, P.A., Plummer, M.G., and Zhai, F. 2010. **The Economics of the ASEAN Economic Community**. Department of Economics and International Business School. Brandeis University.

Phitthayaphinant, P., Nissapa, A., Somboonsuke, B., and Eksomtramage, T. 2012. **An Equation of Oil Palm Plantation Areas in Thailand**. KKU Research Journal 2012: 11(1): pages 66-76.

Plummer, A.G. 2006. **ASEAN–EU economic relationship: Integration and lessons for the ASEAN economic community**. Journal of Asian Economics 17 (2006), pages 427–447.

Puey Ungphakorn Institute for Economic Research. 2019. **Thai Agricultural Microscope through the farmers registration and agriculture census data**. Retrieved November 16, 2019. https://bit.ly/37fP8Ws

Research Development and Innovation for Industry Institute. 2014. **A study of guidelines for improving the industrial structure of oil palm and palm oil in Thailand**. Agricultural Research Development Agency (Public organization).

Saaty, T. L. 1977. **A scaling method for priorities in hierarchical structures**. Journal of Mathematical Psychology, 15, pages 234–281.

_____. 1980. **The analytic hierarchy process**. In NY.

Saswattecha, K. et al. 2015. **Assessing the environmental impact of palm oil produced in Thailand**. Journal of Cleaner Production, 100 (2015), pages 150-169.

Sheil, D., Casson, A., Meijaard, E., van Nordwijk, M. Gaskell, J., Sunderland-Groves, J., Wertz, K. and Kanninen, M. 2009**. The impacts and opportunities of oil palm in Southeast Asia: What do we know and what do we need to know?**. Occasional paper no. 51. CIFOR, Bogor, Indonesia.

Shim, J. P. 1989. **Bibliographical research on the analytic hierarchy process (AHP)**. Socio-Economic Planning Sciences 23, pages 161–167.

Siamhistory. 2013. **Biography of Phraya Pradipat Phu Ban**. Retrieved December 10, 2018. https://www.facebook.com/siamhistory/photos/a.435240936530190/558938444160438/?type=1&theater

SlideShare. 2016. **Global Palm Oil Production by Country in 2015**. Retrieved December 10, 2018. https://www.slideshare.net/GreenPalmOil/2015-global-palm-oil-production-by-country

Smouts, M.C. 2003. **Dictionaire des relations internationals: Approaches concepts doctrine**. Paris: Dalloz.

Somsakul, S. 2011. **Impact of free trade policy in AFTA to the palm oil industry and the economy of Thailand.** Chulalongkorn University, Bangkok.

Sopun, A. 2013. **Attitudes of Palm Oil Industry Entrepreneurs in Krabi Province Toward the Establishment of ASEAN Economic Community 2015**. Chiang Mai University, Chiang Mai.

Stiglitz, J. 2001. **Globalization and its discontents**. New York: W.W. Norton & Company.

Thailand Geopark. 2017. **Southern of Thailand**. Retrieved August 12, 2017. http://www.dmr.go.th/ThailandGeopark/images/S-large.png

Thangavelua, S.M. and Narjokob, J. 2014. **Human capital, FTAs and foreign direct investment flows into ASEAN**. Journal of Asian Economics Volume 35, December 2014, Pages 65–76

Unjan, R., Nissapa, A., and Phitthayaphinant, P. 2013. **An Identification of Impacts of Area Expansion Policy of Oil Palm in Southern Thailand: A Case Study in Phatthalung and Nakhon Si Thammarat Provinces**. Procedia - Social and Behavioral Sciences.Volume 91, 10 October 2013, Pages 489–496.

USDA Foreign Agricultural Service. 2015. **Indonesia Oilseed and Products Annual 2015**. Department of Agriculture, United States.

_____. 2015. **Malaysia Oilseed and Products Annual 2015**. Department of Agriculture, United States.

_____. 2015. **Oilseeds: World Markets and Trade**. Department of Agriculture, United States.

Uttama, N.P. 2014. **Investment Promotion Policy in Potential Border Zone**. Procedia Economics and Finance, Volume 14, 2014, Pages 615–623

Viet, W. 2009. **The Geneva scenarios on global governance 2020**. Geneva, Switzerland: Friedrich-Ebert-Stiftung.

Wikipedia. 2019. **Southern (Thailand)**. Retrieved September 13, 2019. From https://bit.ly/2Wg5wkR

Wongwareethip, V. 1996. **The avenues and export opportunities and the impact of the ASEAN Free Trade Area (for palm oil industry).** Thailand Development Research Institute, Bangkok.

World Bank. 2019. **World Bank Open Data**. Retrieved September 21, 2019. https://data.worldbank.org/

World Economic Forum. 2012. **Global competitiveness report 2011-2012**. Retrieved September 3, 2019. http://www.weforum.org/issues/global.compettitiveness

World Population Review. 2019. **Countries by GDP**. Retrieved September 21, 2019. http://worldpopulationreview.com/countries/countries-by-gdp/

Yamane, T. 1973. **Statistics: An Introductory Analysis 3rd ed**. Tokyo: Harper International Edition.

Zhu, B. and Xu, Z. 2014. **Analytic hierarchy process-hesitant group decision making**. European Journal of Operational Research 239 (2014), pages 794–801

APPENDIX

Department of Economic

University of Evora

Questionnaire title:

The Impacts of the ASEAN Economic Community (AEC)

on Oil Palm Producers in Thailand

By

Ph.D. Student Kanchalika Kongyong

This questionnaire is distributed in order to gather information regarding the farmer's perception of the impact of the ASEAN Economic Community (AEC) on each of the specific domains. The following questions that you will read below pertain to your general information, oil palm production, and your perception. Kindly choose the perception of your choice in answering this questionnaire. Please answer the questions as honestly as possible. Thank you very much for your cooperation.

<u>Part 1</u> General information of farmer (householder)

1. Gender ☐ Male ☐ Female
2. Age _____ years old
3. Education ☐ None ☐ Primary ☐ Secondary
   ☐ High school ☐ Graduate ☐ Master or above
4. Main occupation ☐ Farmer ☐ Business owner ☐ Public servant
   ☐ Private servant ☐ Freelancer ☐ Student
   ☐ Other_____
5. Sub-occupation ☐ Farmer ☐ Business owner ☐ Public servant
   ☐ Private servant ☐ Freelancer ☐ Student
   ☐ Other_____

6. Family member _____ people

Order	Relationship with householder	Age	Marital status	Education	Occupation
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

7. Total income of all family member _____Thai Baht per year
8. Total farm income _____Thai Baht per year
9. Total off-farm income _____Thai Baht per year

<u>Part 2</u> General information about the farm and oil palm production

1. Land plot/property right/area/crop/species

No of land plot(s)	Property right	Area (Rais)	Crop(s)	Species	Year of plantation or replantation
1	__ owner __ Hiring a piece of land from private sector (cost_____Bth/year) __ Hiring a piece of land from public sector (cost_____Bth/year)				
2	__ owner __ Hiring a piece of land from private sector (cost_____Bth/year) __ Hiring a piece of land from public sector (cost_____Bth/year)				
3	__ owner __ Hiring a piece of land from private sector (cost_____Bth/year) __ Hiring a piece of land from public sector (cost_____Bth/year)				
4	__ owner __ Hiring a piece of land from private sector (cost_____Bth/year) __ Hiring a piece of land from public sector (cost_____Bth/year)				

2. Oil palm first plantation in year _____
3. Oil palm last plantation in year _____

4. What crop you have planted before oil palm?

   _____

5. The reasons why you have changed from another crop to oil palm? (can choose more than 1 choice and put order)

   ☐ Price ☐ Flooding problem ☐ Soil problem ☐ Disease problem

   ☐ Insect/animal problem ☐ Government subsidy/policies

   ☐ Easier process ☐ Other _____

6. Family member working in oil palm production _____ people
7. The responsibility between adult male, adult female, child, elder, and hired labor in oil palm production activities.

Activities	**Adult male**	**Adult female**	**Child**	**Elder**	**Hired labor**
1. planting					
2. watering					
3. fertilizing					
4. pest control					
5. weed control					
6. cultivating					
7. maintaining farm implements and equipment					
8. transportation					
9. selling					

8. Time table of Oil palm production-specific by the month of the year

Activities	**Month**												**note**
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	
planting													
watering													
fertilizing													
pest control													
weed control													
cultivating													
maintaining farm implements and equipment													
transportation													
selling													

9. Production cost

Categories	**Thai Baht per Year per Rai (specify by year of oil palm)**							**Note**
	1	**2-3**	**4**	**5**	**6**	**7-25**	**Over 25**	
1. seedling								
2. fertilizer								
3. water								
4. labors - family members - hire labors								
5. farm implements and equipment								
6. fuel								
7. insecticide								
8. herbicide								
9. Transportation								
10. other								

10. The output of Oil palm specify by species and year of oil palm (tons per year per rai)

Species	**tons per year per rai (specify by year of oil palm)**							**Note**
	1	**2-3**	**4**	**5**	**6**	**7-25**	**Over 25**	

11. Another crop

Type of crop	**Area (Rais)**	**The average product per year**	**The average income per year**	**The average cost per year**	**Note**

<u>Part 3</u> Impact of the ASEAN Economic Community (AEC)

Categories	Perception					Note
	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	
1. The production system						
- Increase of skilled labor						
- Increase of modern technology						
- Better opportunity to reach modern technology						
- Increase oil palm varieties						
- Decrease cost of production factors						
- Inequality of reaching the technology						
- Lost the traditional practice						
- Decrease the quality of production factors						
2. The economic system						
- Increase income stability						
- Increase in employment						
- Increase competition between local farm under the AEC scheme						
- Increase competition between ASEAN countries under AEC scheme						
- Increase international competition under the AEC scheme						
- Increase of investment opportunities in oil palm						

Categories	Perception					Note
	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	
- Increase variety of agricultural activities						
- Price risks						
- High investment cost						
- Decrease investment opportunities in other activities						
- Decrease additional household income from other activities						
- Decrease variety of outside agriculture activity						
3. The social system						
- Better livelihood quality						
- Increase the establishment of farmer group						
- More mobilization of labor						
- Better relationship in the community						
- More inequality in society						
- Increase prejudice in solving by the government						
- Increase of crime in the community						
- Increase conflicts between the government and local people						
4. The environment						

Categories	Perception					Note
	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	
- Increase of Green covered areas.						
- Increase Protection of forest fire						
- Increase habitat for aquatic animals in ditches between oil palm rows						
- High maintenance of soil fertility						
- The decrease in forest areas						
- Increase soil problems						
- Prolonged and severe floods						
- Increase of pests						
5. Food security						
- Increase purchasing power						
- Increase food area for community						
- Increase Variety of food sources from higher income						
- Loss possibility of growing food crops themselves						
- Decrease Areas for production of food						
- Decrease food area for community						

Categories	Perception					Note
	Strongly Agree (5)	Agree (4)	Neither Agree nor Disagree (3)	Disagree (2)	Strongly Disagree (1)	
- Decrease Free food/ natural food						

CROSSTAB and Chi-Square Test Between Gender and Other Variables

Crosstabs

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

MaritalStatus * Gender

Crosstab

			Gender		
			Male	Female	Total
MaritalStatus	Single	Count	3	0	3
		% within MaritalStatus	100.0%	.0%	100.0%
		% within Gender	1.0%	.0%	.8%
	Married	Count	294	81	375
		% within MaritalStatus	78.4%	21.6%	100.0%
		% within Gender	96.7%	84.4%	93.8%
	Divorced	Count	4	4	8
		% within MaritalStatus	50.0%	50.0%	100.0%
		% within Gender	1.3%	4.2%	2.0%
	Widow	Count	3	11	14
		% within MaritalStatus	21.4%	78.6%	100.0%
		% within Gender	1.0%	11.5%	3.5%
Total		Count	304	96	400
		% within MaritalStatus	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.954[a]	3	.000
Likelihood Ratio	23.876	3	.000
Linear-by-Linear Association	27.812	1	.000
N of Valid Cases	400		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .72.

ClassesEducation * Gender

Crosstab

			Gender		
			Male	Female	Total
ClassesEducation	None or primary	Count	127	47	174
		% within ClassesEducation	73.0%	27.0%	100.0%
		% within Gender	41.8%	49.0%	43.5%
	Secondary and high school	Count	147	44	191
		% within ClassesEducation	77.0%	23.0%	100.0%
		% within Gender	48.4%	45.8%	47.8%
	Graduate and above	Count	30	5	35
		% within ClassesEducation	85.7%	14.3%	100.0%
		% within Gender	9.9%	5.2%	8.8%
Total		Count	304	96	400
		% within ClassesEducation	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.773[a]	2	.250
Likelihood Ratio	2.969	2	.227
Linear-by-Linear Association	2.540	1	.111
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.40.

SubOccupation * Gender

Crosstab

			Gender		
			Male	Female	Total
SubOccupation	none	Count	202	52	254
		% within SubOccupation	79.5%	20.5%	100.0%
		% within Gender	66.4%	54.2%	63.5%
	Labor inside the agricultural sector	Count	61	28	89
		% within SubOccupation	68.5%	31.5%	100.0%
		% within Gender	20.1%	29.2%	22.3%
	Labor outside the agricultural sector	Count	36	15	51
		% within SubOccupation	70.6%	29.4%	100.0%
		% within Gender	11.8%	15.6%	12.8%
	Family business	Count	5	1	6
		% within SubOccupation	83.3%	16.7%	100.0%
		% within Gender	1.6%	1.0%	1.5%
Total		Count	304	96	400
		% within SubOccupation	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.445[a]	3	.142
Likelihood Ratio	5.322	3	.150
Linear-by-Linear Association	2.702	1	.100
N of Valid Cases	400		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.44.

TotalFamilyMember * Gender

Crosstab

			Gender		
			Male	Female	Total
TotalFamilyMember	2.00	Count	12	6	18
		% within TotalFamilyMember	66.7%	33.3%	100.0%
		% within Gender	3.9%	6.3%	4.5%
	3.00	Count	85	33	118
		% within TotalFamilyMember	72.0%	28.0%	100.0%
		% within Gender	28.0%	34.4%	29.5%
	4.00	Count	169	42	211
		% within TotalFamilyMember	80.1%	19.9%	100.0%
		% within Gender	55.6%	43.8%	52.8%
	5.00	Count	31	8	39
		% within TotalFamilyMember	79.5%	20.5%	100.0%
		% within Gender	10.2%	8.3%	9.8%
	6.00	Count	6	5	11
		% within TotalFamilyMember	54.5%	45.5%	100.0%
		% within Gender	2.0%	5.2%	2.8%
	7.00	Count	1	2	3
		% within TotalFamilyMember	33.3%	66.7%	100.0%
		% within Gender	.3%	2.1%	.8%
Total		Count	304	96	400
		% within TotalFamilyMember	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.847[a]	5	.080
Likelihood Ratio	8.917	5	.112
Linear-by-Linear Association	.014	1	.907
N of Valid Cases	400		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .72.

ClassesTotalArea * Gender

Crosstab

			Gender		
			Male	Female	Total
ClassesTotalArea	Smallholder	Count	241	85	326
		% within ClassesTotalArea	73.9%	26.1%	100.0%
		% within Gender	79.3%	88.5%	81.5%
	Largeholder	Count	63	11	74
		% within ClassesTotalArea	85.1%	14.9%	100.0%
		% within Gender	20.7%	11.5%	18.5%
Total		Count	304	96	400
		% within ClassesTotalArea	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.154[a]	1	.042		
Continuity Correction[b]	3.562	1	.059		
Likelihood Ratio	4.517	1	.034		
Fisher's Exact Test				.049	.026
Linear-by-Linear Association	4.144	1	.042		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 17.76.
b. Computed only for a 2x2 table

ReasonRevenue * Gender

Crosstab

			Gender		
			Male	Female	Total
ReasonRevenue	No	Count	67	21	88
		% within ReasonRevenue	76.1%	23.9%	100.0%
		% within Gender	22.0%	21.9%	22.0%
	Yes	Count	237	75	312
		% within ReasonRevenue	76.0%	24.0%	100.0%
		% within Gender	78.0%	78.1%	78.0%
Total		Count	304	96	400
		% within ReasonRevenue	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.001[a]	1	.973		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.001	1	.973		
Fisher's Exact Test				1.000	.548
Linear-by-Linear Association	.001	1	.973		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 21.12.
b. Computed only for a 2x2 table

ReasonProductionProcess * Gender

Crosstab

			Gender		
			Male	Female	Total
ReasonProductionProcess	No	Count	269	82	351
		% within ReasonProduction Process	76.6%	23.4%	100.0%
		% within Gender	88.5%	85.4%	87.8%
	Yes	Count	35	14	49
		% within ReasonProduction Process	71.4%	28.6%	100.0%
		% within Gender	11.5%	14.6%	12.3%
Total		Count	304	96	400
		% within ReasonProduction Process	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.640[a]	1	.424		
Continuity Correction[b]	.386	1	.534		
Likelihood Ratio	.618	1	.432		
Fisher's Exact Test				.475	.263
Linear-by-Linear Association	.638	1	.424		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.76.
b. Computed only for a 2x2 table

ReasonSupportFromGoverment * Gender

Crosstab

			Gender		
			Male	Female	Total
ReasonSupportFrom Goverment	No	Count	296	93	389
		% within ReasonSupportFromGoverment	76.1%	23.9%	100.0%
		% within Gender	97.4%	96.9%	97.3%
	Yes	Count	8	3	11
		% within ReasonSupportFromGoverment	72.7%	27.3%	100.0%
		% within Gender	2.6%	3.1%	2.8%
Total		Count	304	96	400
		% within ReasonSupportFromGoverment	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.066[a]	1	.797		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.065	1	.799		
Fisher's Exact Test				.730	.515
Linear-by-Linear Association	.066	1	.797		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.64.
b. Computed only for a 2x2 table

ReasonFollowTheOthers * Gender

Crosstab

			Gender		
			Male	Female	Total
ReasonFollowTheOthers	No	Count	289	94	383
		% within ReasonFollowTheOthers	75.5%	24.5%	100.0%
		% within Gender	95.1%	97.9%	95.8%
	Yes	Count	15	2	17
		% within ReasonFollowTheOthers	88.2%	11.8%	100.0%
		% within Gender	4.9%	2.1%	4.3%
Total		Count	304	96	400
		% within ReasonFollowTheOthers	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.457[a]	1	.227		
Continuity Correction[b]	.841	1	.359		
Likelihood Ratio	1.688	1	.194		
Fisher's Exact Test				.382	.182
Linear-by-Linear Association	1.454	1	.228		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.08.
b. Computed only for a 2x2 table

ReasonOther * Gender

Crosstab

			Gender		
			Male	Female	Total
ReasonOther	No	Count	297	93	390
		% within ReasonOther	76.2%	23.8%	100.0%
		% within Gender	97.7%	96.9%	97.5%
	Yes	Count	7	3	10
		% within ReasonOther	70.0%	30.0%	100.0%
		% within Gender	2.3%	3.1%	2.5%
Total		Count	304	96	400
		% within ReasonOther	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.202[a]	1	.653		
Continuity Correction[b]	.006	1	.940		
Likelihood Ratio	.193	1	.661		
Fisher's Exact Test				.709	.445
Linear-by-Linear Association	.202	1	.653		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.40.
b. Computed only for a 2x2 table

TotalFamilymemberWorkingInOilPalmProduction * Gender

Crosstab

			Gender		
			Male	Female	Total
TotalFamilymemberWorkingInOilPalmProduction	1.00	Count	72	25	97
		% within TotalFamilymemberWorkingInOilPalmProduction	74.2%	25.8%	100.0%
		% within Gender	23.7%	26.0%	24.3%
	2.00	Count	187	55	242
		% within TotalFamilymemberWorkingInOilPalmProduction	77.3%	22.7%	100.0%
		% within Gender	61.5%	57.3%	60.5%
	3.00	Count	44	16	60
		% within TotalFamilymemberWorkingInOilPalmProduction	73.3%	26.7%	100.0%
		% within Gender	14.5%	16.7%	15.0%
	5.00	Count	1	0	1
		% within TotalFamilymemberWorkingInOilPalmProduction	100.0%	.0%	100.0%
		% within Gender	.3%	.0%	.3%
Total		Count	304	96	400
		% within TotalFamilymemberWorkingInOilPalmProduction	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.932[a]	3	.818
Likelihood Ratio	1.159	3	.763
Linear-by-Linear Association	.024	1	.878
N of Valid Cases	400		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .24.

Buyer * Gender

Crosstab

			Gender		
			Male	Female	Total
Buyer	Middle man	Count	282	87	369
		% within Buyer	76.4%	23.6%	100.0%
		% within Gender	92.8%	90.6%	92.3%
	Mill	Count	18	8	26
		% within Buyer	69.2%	30.8%	100.0%
		% within Gender	5.9%	8.3%	6.5%
	Other	Count	4	1	5
		% within Buyer	80.0%	20.0%	100.0%
		% within Gender	1.3%	1.0%	1.3%
Total		Count	304	96	400
		% within Buyer	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.733[a]	2	.693
Likelihood Ratio	.699	2	.705
Linear-by-Linear Association	.237	1	.627
N of Valid Cases	400		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.20.

ReasonToSellOilPalmToBuyer * Gender

Crosstab

			Gender		
			Male	Female	Total
ReasonToSellOilPalmToBuyer	better price	Count	250	80	330
		% within ReasonToSellOilPalmToBuyer	75.8%	24.2%	100.0%
		% within Gender	82.2%	83.3%	82.5%
	friendship	Count	13	7	20
		% within ReasonToSellOilPalmToBuyer	65.0%	35.0%	100.0%
		% within Gender	4.3%	7.3%	5.0%
	more comfortable for transportation	Count	16	4	20
		% within ReasonToSellOilPalmToBuyer	80.0%	20.0%	100.0%
		% within Gender	5.3%	4.2%	5.0%
	contract	Count	10	4	14
		% within ReasonToSellOilPalmToBuyer	71.4%	28.6%	100.0%
		% within Gender	3.3%	4.2%	3.5%
	other	Count	15	1	16
		% within ReasonToSellOilPalmToBuyer	93.8%	6.3%	100.0%
		% within Gender	4.9%	1.0%	4.0%
Total		Count	304	96	400
		% within ReasonToSellOilPalmToBuyer	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.437[a]	4	.350
Likelihood Ratio	5.171	4	.270
Linear-by-Linear Association	1.034	1	.309
N of Valid Cases	400		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 3.36.

SourceOfMoneyForInvestmentSelfFunding * Gender

Crosstab

			Gender		
			Male	Female	Total
SourceOfMoneyForInvestmentSelfFunding	Yes	Count	304	96	400
		% within SourceOfMoneyForInvestmentSelfFunding	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%
Total		Count	304	96	400
		% within SourceOfMoneyForInvestmentSelfFunding	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value
Pearson Chi-Square	.[a]
N of Valid Cases	400

a. No statistics are computed because SourceOfMoneyForInvestmentSelfFunding is a constant.

SourceOfMoneyForInvestmentGovernment * Gender

Crosstab

			Gender		
			Male	Female	Total
SourceOfMoneyForInvestmentGovernment	No	Count	220	59	279
		% within SourceOfMoneyForInvestmentGovernment	78.9%	21.1%	100.0%
		% within Gender	72.4%	61.5%	69.8%
	Yes	Count	84	37	121
		% within SourceOfMoneyForInvestmentGovernment	69.4%	30.6%	100.0%
		% within Gender	27.6%	38.5%	30.3%
Total		Count	304	96	400
		% within SourceOfMoneyForInvestmentGovernment	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.116[a]	1	.042		
Continuity Correction[b]	3.615	1	.057		
Likelihood Ratio	3.997	1	.046		
Fisher's Exact Test				.055	.030
Linear-by-Linear Association	4.106	1	.043		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 29.04.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentBank * Gender

Crosstab

			Gender		
			Male	Female	Total
SourceOfMoneyForInvestmentBank	No	Count	58	26	84
		% within SourceOfMoneyForInvestmentBank	69.0%	31.0%	100.0%
		% within Gender	19.1%	27.1%	21.0%
	Yes	Count	246	70	316
		% within SourceOfMoneyForInvestmentBank	77.8%	22.2%	100.0%
		% within Gender	80.9%	72.9%	79.0%
Total		Count	304	96	400
		% within SourceOfMoneyForInvestmentBank	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.818[a]	1	.093		
Continuity Correction[b]	2.356	1	.125		
Likelihood Ratio	2.703	1	.100		
Fisher's Exact Test				.113	.064
Linear-by-Linear Association	2.811	1	.094		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.16.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentLoanShark * Gender

Crosstab

			Gender		
			Male	Female	Total
SourceOfMoneyForInvestmentLoanShark	No	Count	303	95	398
		% within SourceOfMoneyForInvestmentLoanShark	76.1%	23.9%	100.0%
		% within Gender	99.7%	99.0%	99.5%
	Yes	Count	1	1	2
		% within SourceOfMoneyForInvestmentLoanShark	50.0%	50.0%	100.0%
		% within Gender	.3%	1.0%	.5%
Total		Count	304	96	400
		% within SourceOfMoneyForInvestmentLoanShark	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.745[a]	1	.388		
Continuity Correction[b]	.001	1	.974		
Likelihood Ratio	.634	1	.426		
Fisher's Exact Test				.423	.423
Linear-by-Linear Association	.743	1	.389		
N of Valid Cases	400				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .48.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentOther * Gender

Crosstab

			Gender		
			Male	Female	Total
SourceOfMoneyForInvestmentOther	No	Count	258	83	341
		% within SourceOfMoneyForInvestmentOther	75.7%	24.3%	100.0%
		% within Gender	84.9%	86.5%	85.3%
	Yes	Count	46	13	59
		% within SourceOfMoneyForInvestmentOther	78.0%	22.0%	100.0%
		% within Gender	15.1%	13.5%	14.8%
Total		Count	304	96	400
		% within SourceOfMoneyForInvestmentOther	76.0%	24.0%	100.0%
		% within Gender	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.147[a]	1	.702		
Continuity Correction[b]	.047	1	.828		
Likelihood Ratio	.149	1	.699		
Fisher's Exact Test				.869	.421
Linear-by-Linear Association	.146	1	.702		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.16.
b. Computed only for a 2x2 table

CROSSTAB and Chi-Square Test Between Class of Age and Other Variables

Crosstabs

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

MaritalStatus * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
MaritalStatus	Single	Count	3	0	3
		% within MaritalStatus	100.0%	.0%	100.0%
		% within ClassesAge	1.5%	.0%	.8%
	Married	Count	180	195	375
		% within MaritalStatus	48.0%	52.0%	100.0%
		% within ClassesAge	92.8%	94.7%	93.8%
	Divorced	Count	4	4	8
		% within MaritalStatus	50.0%	50.0%	100.0%
		% within ClassesAge	2.1%	1.9%	2.0%
	Widow	Count	7	7	14
		% within MaritalStatus	50.0%	50.0%	100.0%
		% within ClassesAge	3.6%	3.4%	3.5%
Total		Count	194	206	400
		% within MaritalStatus	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.243[a]	3	.356
Likelihood Ratio	4.399	3	.221
Linear-by-Linear Association	.063	1	.802
N of Valid Cases	400		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 1.46.

ClassesEducation * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ClassesEducation	None or primary	Count	82	92	174
		% within ClassesEducation	47.1%	52.9%	100.0%
		% within ClassesAge	42.3%	44.7%	43.5%
	Secondary and high school	Count	98	93	191
		% within ClassesEducation	51.3%	48.7%	100.0%
		% within ClassesAge	50.5%	45.1%	47.8%
	Graduate and above	Count	14	21	35
		% within ClassesEducation	40.0%	60.0%	100.0%
		% within ClassesAge	7.2%	10.2%	8.8%
Total		Count	194	206	400
		% within ClassesEducation	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.747[a]	2	.417
Likelihood Ratio	1.755	2	.416
Linear-by-Linear Association	.009	1	.927
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.98.

SubOccupation * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
SubOccupation	none	Count	122	132	254
		% within SubOccupation	48.0%	52.0%	100.0%
		% within ClassesAge	62.9%	64.1%	63.5%
	Labor inside the agricultural sector	Count	42	47	89
		% within SubOccupation	47.2%	52.8%	100.0%
		% within ClassesAge	21.6%	22.8%	22.3%
	Labor outside the agricultural sector	Count	27	24	51
		% within SubOccupation	52.9%	47.1%	100.0%
		% within ClassesAge	13.9%	11.7%	12.8%
	Family business	Count	3	3	6
		% within SubOccupation	50.0%	50.0%	100.0%
		% within ClassesAge	1.5%	1.5%	1.5%
Total		Count	194	206	400
		% within SubOccupation	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.492[a]	3	.921
Likelihood Ratio	.491	3	.921
Linear-by-Linear Association	.222	1	.638
N of Valid Cases	400		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.91.

TotalFamilyMember * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
TotalFamilyMember	2.00	Count	11	7	18
		% within TotalFamilyMember	61.1%	38.9%	100.0%
		% within ClassesAge	5.7%	3.4%	4.5%
	3.00	Count	59	59	118
		% within TotalFamilyMember	50.0%	50.0%	100.0%
		% within ClassesAge	30.4%	28.6%	29.5%
	4.00	Count	99	112	211
		% within TotalFamilyMember	46.9%	53.1%	100.0%
		% within ClassesAge	51.0%	54.4%	52.8%
	5.00	Count	19	20	39
		% within TotalFamilyMember	48.7%	51.3%	100.0%
		% within ClassesAge	9.8%	9.7%	9.8%
	6.00	Count	6	5	11
		% within TotalFamilyMember	54.5%	45.5%	100.0%
		% within ClassesAge	3.1%	2.4%	2.8%
	7.00	Count	0	3	3
		% within TotalFamilyMember	.0%	100.0%	100.0%
		% within ClassesAge	.0%	1.5%	.8%
Total		Count	194	206	400
		% within TotalFamilyMember	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.450[a]	5	.487
Likelihood Ratio	5.613	5	.346
Linear-by-Linear Association	1.213	1	.271
N of Valid Cases	400		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 1.46.

ClassesTotalArea * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ClassesTotalArea	Smallholder	Count	154	172	326
		% within ClassesTotalArea	47.2%	52.8%	100.0%
		% within ClassesAge	79.4%	83.5%	81.5%
	Largeholder	Count	40	34	74
		% within ClassesTotalArea	54.1%	45.9%	100.0%
		% within ClassesAge	20.6%	16.5%	18.5%
Total		Count	194	206	400
		% within ClassesTotalArea	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.121[a]	1	.290		
Continuity Correction[b]	.865	1	.352		
Likelihood Ratio	1.121	1	.290		
Fisher's Exact Test				.305	.176
Linear-by-Linear Association	1.119	1	.290		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 35.89.
b. Computed only for a 2x2 table

ReasonRevenue * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ReasonRevenue	No	Count	43	45	88
		% within ReasonRevenue	48.9%	51.1%	100.0%
		% within ClassesAge	22.2%	21.8%	22.0%
	Yes	Count	151	161	312
		% within ReasonRevenue	48.4%	51.6%	100.0%
		% within ClassesAge	77.8%	78.2%	78.0%
Total		Count	194	206	400
		% within ReasonRevenue	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.006[a]	1	.938		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.006	1	.938		
Fisher's Exact Test				1.000	.517
Linear-by-Linear Association	.006	1	.938		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 42.68.
b. Computed only for a 2x2 table

ReasonProductionProcess * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ReasonProductionProcess	No	Count	172	179	351
		% within ReasonProductionProcess	49.0%	51.0%	100.0%
		% within ClassesAge	88.7%	86.9%	87.8%
	Yes	Count	22	27	49
		% within ReasonProductionProcess	44.9%	55.1%	100.0%
		% within ClassesAge	11.3%	13.1%	12.3%
Total		Count	194	206	400
		% within ReasonProductionProcess	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.290[a]	1	.590		
Continuity Correction[b]	.149	1	.699		
Likelihood Ratio	.291	1	.590		
Fisher's Exact Test				.648	.350
Linear-by-Linear Association	.289	1	.591		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 23.77.
b. Computed only for a 2x2 table

ReasonSupportFromGoverment * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ReasonSupport FromGoverment	No	Count	189	200	389
		% within ReasonSupportFromGoverment	48.6%	51.4%	100.0%
		% within ClassesAge	97.4%	97.1%	97.3%
	Yes	Count	5	6	11
		% within ReasonSupportFromGoverment	45.5%	54.5%	100.0%
		% within ClassesAge	2.6%	2.9%	2.8%
Total		Count	194	206	400
		% within ReasonSupportFromGoverment	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.042[a]	1	.838		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.042	1	.837		
Fisher's Exact Test				1.000	.541
Linear-by-Linear Association	.042	1	.838		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.34.
b. Computed only for a 2x2 table

ReasonFollowTheOthers * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ReasonFollowTheOthers	No	Count	188	195	383
		% within ReasonFollowTheOthers	49.1%	50.9%	100.0%
		% within ClassesAge	96.9%	94.7%	95.8%
	Yes	Count	6	11	17
		% within ReasonFollowTheOthers	35.3%	64.7%	100.0%
		% within ClassesAge	3.1%	5.3%	4.3%
Total		Count	194	206	400
		% within ReasonFollowTheOthers	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.240[a]	1	.266		
Continuity Correction[b]	.749	1	.387		
Likelihood Ratio	1.260	1	.262		
Fisher's Exact Test				.326	.194
Linear-by-Linear Association	1.237	1	.266		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.25.
b. Computed only for a 2x2 table

ReasonOther * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ReasonOther	No	Count	187	203	390
		% within ReasonOther	47.9%	52.1%	100.0%
		% within ClassesAge	96.4%	98.5%	97.5%
	Yes	Count	7	3	10
		% within ReasonOther	70.0%	30.0%	100.0%
		% within ClassesAge	3.6%	1.5%	2.5%
Total		Count	194	206	400
		% within ReasonOther	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.898[a]	1	.168		
Continuity Correction[b]	1.118	1	.290		
Likelihood Ratio	1.942	1	.163		
Fisher's Exact Test				.209	.145
Linear-by-Linear Association	1.893	1	.169		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.85.
b. Computed only for a 2x2 table

TotalFamilymemberWorkingInOilPalmProduction * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
TotalFamilymemberWorkingInOilPalmProduction	1.00	Count	49	48	97
		% within TotalFamilymemberWorkingInOilPalmProduction	50.5%	49.5%	100.0%
		% within ClassesAge	25.3%	23.3%	24.3%
	2.00	Count	114	128	242
		% within TotalFamilymemberWorkingInOilPalmProduction	47.1%	52.9%	100.0%
		% within ClassesAge	58.8%	62.1%	60.5%
	3.00	Count	31	29	60
		% within TotalFamilymemberWorkingInOilPalmProduction	51.7%	48.3%	100.0%
		% within ClassesAge	16.0%	14.1%	15.0%
	5.00	Count	0	1	1
		% within TotalFamilymemberWorkingInOilPalmProduction	.0%	100.0%	100.0%
		% within ClassesAge	.0%	.5%	.3%
Total		Count	194	206	400
		% within TotalFamilymemberWorkingInOilPalmProduction	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.528[a]	3	.676
Likelihood Ratio	1.914	3	.591
Linear-by-Linear Association	.056	1	.813
N of Valid Cases	400		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .49.

Buyer * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
Buyer	Middle man	Count	183	186	369
		% within Buyer	49.6%	50.4%	100.0%
		% within ClassesAge	94.3%	90.3%	92.3%
	Mill	Count	9	17	26
		% within Buyer	34.6%	65.4%	100.0%
		% within ClassesAge	4.6%	8.3%	6.5%
	Other	Count	2	3	5
		% within Buyer	40.0%	60.0%	100.0%
		% within ClassesAge	1.0%	1.5%	1.3%
Total		Count	194	206	400
		% within Buyer	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.328[a]	2	.312
Likelihood Ratio	2.368	2	.306
Linear-by-Linear Association	1.858	1	.173
N of Valid Cases	400		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.43.

ReasonToSellOilPalmToBuyer * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
ReasonToSellOilPalmToBuyer	better price	Count	162	168	330
		% within ReasonToSellOilPalmToBuyer	49.1%	50.9%	100.0%
		% within ClassesAge	83.5%	81.6%	82.5%
	friendship	Count	10	10	20
		% within ReasonToSellOilPalmToBuyer	50.0%	50.0%	100.0%
		% within ClassesAge	5.2%	4.9%	5.0%
	more comfortable for transportation	Count	10	10	20
		% within ReasonToSellOilPalmToBuyer	50.0%	50.0%	100.0%
		% within ClassesAge	5.2%	4.9%	5.0%
	contract	Count	6	8	14
		% within ReasonToSellOilPalmToBuyer	42.9%	57.1%	100.0%
		% within ClassesAge	3.1%	3.9%	3.5%
	other	Count	6	10	16
		% within ReasonToSellOilPalmToBuyer	37.5%	62.5%	100.0%
		% within ClassesAge	3.1%	4.9%	4.0%
Total		Count	194	206	400
		% within ReasonToSellOilPalmToBuyer	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.036[a]	4	.904
Likelihood Ratio	1.046	4	.903
Linear-by-Linear Association	.700	1	.403
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.79.

SourceOfMoneyForInvestmentSelfFunding * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
SourceOfMoneyForInvestmentSelfFunding	Yes	Count	194	206	400
		% within SourceOfMoneyForInvestmentSelfFunding	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%
Total		Count	194	206	400
		% within SourceOfMoneyForInvestmentSelfFunding	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value
Pearson Chi-Square	.[a]
N of Valid Cases	400

a. No statistics are computed because SourceOfMoneyForInvestmentSelfFunding is a constant.

SourceOfMoneyForInvestmentGovernment * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
SourceOfMoneyForInvestment Government	No	Count	139	140	279
		% within SourceOfMoneyForInvestment Government	49.8%	50.2%	100.0%
		% within ClassesAge	71.6%	68.0%	69.8%
	Yes	Count	55	66	121
		% within SourceOfMoneyForInvestment Government	45.5%	54.5%	100.0%
		% within ClassesAge	28.4%	32.0%	30.3%
Total		Count	194	206	400
		% within SourceOfMoneyForInvestment Government	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.644[a]	1	.422		
Continuity Correction[b]	.481	1	.488		
Likelihood Ratio	.645	1	.422		
Fisher's Exact Test				.447	.244
Linear-by-Linear Association	.643	1	.423		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 58.69.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentBank * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
SourceOfMoneyForInvestment Bank	No	Count	32	52	84
		% within SourceOfMoneyForInvestment Bank	38.1%	61.9%	100.0%
		% within ClassesAge	16.5%	25.2%	21.0%
	Yes	Count	162	154	316
		% within SourceOfMoneyForInvestment Bank	51.3%	48.7%	100.0%
		% within ClassesAge	83.5%	74.8%	79.0%
Total		Count	194	206	400
		% within SourceOfMoneyForInvestment Bank	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.609[a]	1	.032		
Continuity Correction[b]	4.096	1	.043		
Likelihood Ratio	4.650	1	.031		
Fisher's Exact Test				.037	.021
Linear-by-Linear Association	4.597	1	.032		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 40.74.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentLoanShark * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
SourceOfMoneyForInvestment LoanShark	No	Count	193	205	398
		% within SourceOfMoneyForInvestment LoanShark	48.5%	51.5%	100.0%
		% within ClassesAge	99.5%	99.5%	99.5%
	Yes	Count	1	1	2
		% within SourceOfMoneyForInvestment LoanShark	50.0%	50.0%	100.0%
		% within ClassesAge	.5%	.5%	.5%
Total		Count	194	206	400
		% within SourceOfMoneyForInvestment LoanShark	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.002[a]	1	.966		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.002	1	.966		
Fisher's Exact Test				1.000	.735
Linear-by-Linear Association	.002	1	.966		
N of Valid Cases	400				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .97.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentOther * ClassesAge

Crosstab

			ClassesAge		
			Young farmers	Old farmers	Total
SourceOfMoneyForInvestment Other	No	Count	163	178	341
		% within SourceOfMoneyForInvestment Other	47.8%	52.2%	100.0%
		% within ClassesAge	84.0%	86.4%	85.3%
	Yes	Count	31	28	59
		% within SourceOfMoneyForInvestment Other	52.5%	47.5%	100.0%
		% within ClassesAge	16.0%	13.6%	14.8%
Total		Count	194	206	400
		% within SourceOfMoneyForInvestment Other	48.5%	51.5%	100.0%
		% within ClassesAge	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.453[a]	1	.501		
Continuity Correction[b]	.283	1	.595		
Likelihood Ratio	.453	1	.501		
Fisher's Exact Test				.573	.297
Linear-by-Linear Association	.452	1	.502		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 28.62.
b. Computed only for a 2x2 table

CROSSTAB and Chi-Square Test Between Class of Education and Other Variables

Crosstabs

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

MaritalStatus * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
Marital Status	Single	Count	2	1	0	3
		% within MaritalStatus	66.7%	33.3%	.0%	100.0%
		% within ClassesEducation	1.1%	.5%	.0%	.8%
	Married	Count	159	182	34	375
		% within MaritalStatus	42.4%	48.5%	9.1%	100.0%
		% within ClassesEducation	91.4%	95.3%	97.1%	93.8%
	Divorced	Count	4	4	0	8
		% within MaritalStatus	50.0%	50.0%	.0%	100.0%
		% within ClassesEducation	2.3%	2.1%	.0%	2.0%
	Widow	Count	9	4	1	14
		% within MaritalStatus	64.3%	28.6%	7.1%	100.0%
		% within ClassesEducation	5.2%	2.1%	2.9%	3.5%
Total		Count	174	191	35	400
		% within MaritalStatus	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.255[a]	6	.642
Likelihood Ratio	5.183	6	.521
Linear-by-Linear Association	1.648	1	.199
N of Valid Cases	400		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .26.

SubOccupation * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
SubOccupation	none	Count	114	120	20	254
		% within SubOccupation	44.9%	47.2%	7.9%	100.0%
		% within ClassesEducation	65.5%	62.8%	57.1%	63.5%
	Labor inside the agricultural sector	Count	39	42	8	89
		% within SubOccupation	43.8%	47.2%	9.0%	100.0%
		% within ClassesEducation	22.4%	22.0%	22.9%	22.3%
	Labor outside the agricultural sector	Count	20	26	5	51
		% within SubOccupation	39.2%	51.0%	9.8%	100.0%
		% within ClassesEducation	11.5%	13.6%	14.3%	12.8%
	Family business	Count	1	3	2	6
		% within SubOccupation	16.7%	50.0%	33.3%	100.0%
		% within ClassesEducation	.6%	1.6%	5.7%	1.5%
Total		Count	174	191	35	400
		% within SubOccupation	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.897[a]	6	.435
Likelihood Ratio	4.470	6	.613
Linear-by-Linear Association	2.234	1	.135
N of Valid Cases	400		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .53.

TotalFamilyMember * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
TotalFamilyMember	2.00	Count	8	8	2	18
		% within TotalFamilyMember	44.4%	44.4%	11.1%	100.0%
		% within ClassesEducation	4.6%	4.2%	5.7%	4.5%
	3.00	Count	45	58	15	118
		% within TotalFamilyMember	38.1%	49.2%	12.7%	100.0%
		% within ClassesEducation	25.9%	30.4%	42.9%	29.5%
	4.00	Count	100	95	16	211
		% within TotalFamilyMember	47.4%	45.0%	7.6%	100.0%
		% within ClassesEducation	57.5%	49.7%	45.7%	52.8%
	5.00	Count	17	21	1	39
		% within TotalFamilyMember	43.6%	53.8%	2.6%	100.0%
		% within ClassesEducation	9.8%	11.0%	2.9%	9.8%
	6.00	Count	4	6	1	11
		% within TotalFamilyMember	36.4%	54.5%	9.1%	100.0%
		% within ClassesEducation	2.3%	3.1%	2.9%	2.8%
	7.00	Count	0	3	0	3
		% within TotalFamilyMember	.0%	100.0%	.0%	100.0%
		% within ClassesEducation	.0%	1.6%	.0%	.8%
Total		Count	174	191	35	400
		% within TotalFamilyMember	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.026[a]	10	.438
Likelihood Ratio	11.598	10	.313
Linear-by-Linear Association	.743	1	.389
N of Valid Cases	400		

a. 7 cells (38.9%) have expected count less than 5. The minimum expected count is .26.

ClassesTotalArea * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ClassesTotalArea	Smallholder	Count	132	162	32	326
		% within ClassesTotalArea	40.5%	49.7%	9.8%	100.0%
		% within ClassesEducation	75.9%	84.8%	91.4%	81.5%
	Largeholder	Count	42	29	3	74
		% within ClassesTotalArea	56.8%	39.2%	4.1%	100.0%
		% within ClassesEducation	24.1%	15.2%	8.6%	18.5%
Total		Count	174	191	35	400
		% within ClassesTotalArea	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.350[a]	2	.025
Likelihood Ratio	7.626	2	.022
Linear-by-Linear Association	7.266	1	.007
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.48.

ReasonRevenue * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ReasonRevenue	No	Count	35	48	5	88
		% within ReasonRevenue	39.8%	54.5%	5.7%	100.0%
		% within ClassesEducation	20.1%	25.1%	14.3%	22.0%
	Yes	Count	139	143	30	312
		% within ReasonRevenue	44.6%	45.8%	9.6%	100.0%
		% within ClassesEducation	79.9%	74.9%	85.7%	78.0%
Total		Count	174	191	35	400
		% within ReasonRevenue	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.665[a]	2	.264
Likelihood Ratio	2.766	2	.251
Linear-by-Linear Association	.012	1	.912
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.70.

ReasonProductionProcess * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ReasonProduction Process	No	Count	152	165	34	351
		% within ReasonProductionProcess	43.3%	47.0%	9.7%	100.0%
		% within ClassesEducation	87.4%	86.4%	97.1%	87.8%
	Yes	Count	22	26	1	49
		% within ReasonProductionProcess	44.9%	53.1%	2.0%	100.0%
		% within ClassesEducation	12.6%	13.6%	2.9%	12.3%
Total		Count	174	191	35	400
		% within ReasonProductionProcess	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.228[a]	2	.199
Likelihood Ratio	4.348	2	.114
Linear-by-Linear Association	.911	1	.340
N of Valid Cases	400		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 4.29.

ReasonSupportFromGoverment * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ReasonSupport FromGoverment	No	Count	171	183	35	389
		% within ReasonSupportFrom Goverment	44.0%	47.0%	9.0%	100.0%
		% within ClassesEducation	98.3%	95.8%	100.0%	97.3%
	Yes	Count	3	8	0	11
		% within ReasonSupportFrom Goverment	27.3%	72.7%	.0%	100.0%
		% within ClassesEducation	1.7%	4.2%	.0%	2.8%
Total		Count	174	191	35	400
		% within ReasonSupportFrom Goverment	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.152[a]	2	.207
Likelihood Ratio	4.017	2	.134
Linear-by-Linear Association	.157	1	.692
N of Valid Cases	400		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .96.

ReasonFollowTheOthers * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ReasonFollowTheOthers	No	Count	167	183	33	383
		% within ReasonFollowTheOthers	43.6%	47.8%	8.6%	100.0%
		% within ClassesEducation	96.0%	95.8%	94.3%	95.8%
	Yes	Count	7	8	2	17
		% within ReasonFollowTheOthers	41.2%	47.1%	11.8%	100.0%
		% within ClassesEducation	4.0%	4.2%	5.7%	4.3%
Total		Count	174	191	35	400
		% within ReasonFollowTheOthers	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.208[a]	2	.901
Likelihood Ratio	.191	2	.909
Linear-by-Linear Association	.126	1	.723
N of Valid Cases	400		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 1.49.

ReasonOther * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ReasonOther	No	Count	168	188	34	390
		% within ReasonOther	43.1%	48.2%	8.7%	100.0%
		% within ClassesEducation	96.6%	98.4%	97.1%	97.5%
	Yes	Count	6	3	1	10
		% within ReasonOther	60.0%	30.0%	10.0%	100.0%
		% within ClassesEducation	3.4%	1.6%	2.9%	2.5%
Total		Count	174	191	35	400
		% within ReasonOther	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.337[a]	2	.512
Likelihood Ratio	1.371	2	.504
Linear-by-Linear Association	.592	1	.442
N of Valid Cases	400		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .88.

TotalFamilymemberWorkingInOilPalmProduction * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
TotalFamilymemberWorkingInOilPalmProduction	1.00	Count	45	42	10	97
		% within TotalFamilymemberWorkingInOilPalmProduction	46.4%	43.3%	10.3%	100.0%
		% within ClassesEducation	25.9%	22.0%	28.6%	24.3%
	2.00	Count	108	118	16	242
		% within TotalFamilymemberWorkingInOilPalmProduction	44.6%	48.8%	6.6%	100.0%
		% within ClassesEducation	62.1%	61.8%	45.7%	60.5%
	3.00	Count	21	31	8	60
		% within TotalFamilymemberWorkingInOilPalmProduction	35.0%	51.7%	13.3%	100.0%
		% within ClassesEducation	12.1%	16.2%	22.9%	15.0%
	5.00	Count	0	0	1	1
		% within TotalFamilymemberWorkingInOilPalmProduction	.0%	.0%	100.0%	100.0%
		% within ClassesEducation	.0%	.0%	2.9%	.3%
Total		Count	174	191	35	400
		% within TotalFamilymemberWorkingInOilPalmProduction	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.304[a]	6	.018
Likelihood Ratio	9.725	6	.137
Linear-by-Linear Association	2.646	1	.104
N of Valid Cases	400		

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is .09.

Buyer * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
Buyer	Middle man	Count	162	177	30	369
		% within Buyer	43.9%	48.0%	8.1%	100.0%
		% within ClassesEducation	93.1%	92.7%	85.7%	92.3%
	Mill	Count	10	11	5	26
		% within Buyer	38.5%	42.3%	19.2%	100.0%
		% within ClassesEducation	5.7%	5.8%	14.3%	6.5%
	Other	Count	2	3	0	5
		% within Buyer	40.0%	60.0%	.0%	100.0%
		% within ClassesEducation	1.1%	1.6%	.0%	1.3%
Total		Count	174	191	35	400
		% within Buyer	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.365[a]	4	.359
Likelihood Ratio	3.968	4	.410
Linear-by-Linear Association	.715	1	.398
N of Valid Cases	400		

a. 4 cells (44.4%) have expected count less than 5. The minimum expected count is .44.

ReasonToSellOilPalmToBuyer * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
ReasonToSellOilPalmToBuyer	better price	Count	148	157	25	330
		% within ReasonToSellOilPalmToBuyer	44.8%	47.6%	7.6%	100.0%
		% within ClassesEducation	85.1%	82.2%	71.4%	82.5%
	friendship	Count	5	13	2	20
		% within ReasonToSellOilPalmToBuyer	25.0%	65.0%	10.0%	100.0%
		% within ClassesEducation	2.9%	6.8%	5.7%	5.0%
	more comfortable for transportation	Count	9	7	4	20
		% within ReasonToSellOilPalmToBuyer	45.0%	35.0%	20.0%	100.0%
		% within ClassesEducation	5.2%	3.7%	11.4%	5.0%
	contract	Count	6	6	2	14
		% within ReasonToSellOilPalmToBuyer	42.9%	42.9%	14.3%	100.0%
		% within ClassesEducation	3.4%	3.1%	5.7%	3.5%
	other	Count	6	8	2	16
		% within ReasonToSellOilPalmToBuyer	37.5%	50.0%	12.5%	100.0%
		% within ClassesEducation	3.4%	4.2%	5.7%	4.0%
Total		Count	174	191	35	400
		% within ReasonToSellOilPalmToBuyer	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.068[a]	8	.427
Likelihood Ratio	7.440	8	.490
Linear-by-Linear Association	1.673	1	.196
N of Valid Cases	400		

a. 4 cells (26.7%) have expected count less than 5. The minimum expected count is 1.23.

SourceOfMoneyForInvestmentSelfFunding * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
SourceOfMoneyForInvestmentSelfFunding	Yes	Count	174	191	35	400
		% within SourceOfMoneyForInvestmentSelfFunding	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%
Total		Count	174	191	35	400
		% within SourceOfMoneyForInvestmentSelfFunding	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value
Pearson Chi-Square	.[a]
N of Valid Cases	400

a. No statistics are computed because SourceOfMoneyForInvestmentSelfFunding is a constant.

SourceOfMoneyForInvestmentGovernment * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
SourceOfMoneyForInvestment Government	No	Count	115	137	27	279
		% within SourceOfMoneyForInvestment Government	41.2%	49.1%	9.7%	100.0%
		% within ClassesEducation	66.1%	71.7%	77.1%	69.8%
	Yes	Count	59	54	8	121
		% within SourceOfMoneyForInvestment Government	48.8%	44.6%	6.6%	100.0%
		% within ClassesEducation	33.9%	28.3%	22.9%	30.3%
Total		Count	174	191	35	400
		% within SourceOfMoneyForInvestment Government	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.364[a]	2	.307
Likelihood Ratio	2.395	2	.302
Linear-by-Linear Association	2.358	1	.125
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.59.

SourceOfMoneyForInvestmentBank * ClassesEducation

Crosstab

			ClassesEducation			
			None or primary	Secondary and high school	Graduate and above	Total
SourceOfMoneyForInvestment Bank	No	Count	41	36	7	84
		% within SourceOfMoneyForInvestment Bank	48.8%	42.9%	8.3%	100.0%
		% within ClassesEducation	23.6%	18.8%	20.0%	21.0%
	Yes	Count	133	155	28	316
		% within SourceOfMoneyForInvestment Bank	42.1%	49.1%	8.9%	100.0%
		% within ClassesEducation	76.4%	81.2%	80.0%	79.0%
Total		Count	174	191	35	400
		% within SourceOfMoneyForInvestment Bank	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.243[a]	2	.537
Likelihood Ratio	1.238	2	.538
Linear-by-Linear Association	.866	1	.352
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.35.

SourceOfMoneyForInvestmentLoanShark * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
SourceOfMoneyForInvestment LoanShark	No	Count	173	190	35	398
		% within SourceOfMoneyForInvestment LoanShark	43.5%	47.7%	8.8%	100.0%
		% within ClassesEducation	99.4%	99.5%	100.0%	99.5%
	Yes	Count	1	1	0	2
		% within SourceOfMoneyForInvestment LoanShark	50.0%	50.0%	.0%	100.0%
		% within ClassesEducation	.6%	.5%	.0%	.5%
Total		Count	174	191	35	400
		% within SourceOfMoneyForInvestment LoanShark	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.198[a]	2	.906
Likelihood Ratio	.372	2	.830
Linear-by-Linear Association	.116	1	.733
N of Valid Cases	400		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .18.

SourceOfMoneyForInvestmentOther * ClassesEducation

Crosstab

			ClassesEducation			Total
			None or primary	Secondary and high school	Graduate and above	
SourceOfMoneyForInvestment Other	No	Count	149	162	30	341
		% within SourceOfMoneyForInvestment Other	43.7%	47.5%	8.8%	100.0%
		% within ClassesEducation	85.6%	84.8%	85.7%	85.3%
	Yes	Count	25	29	5	59
		% within SourceOfMoneyForInvestment Other	42.4%	49.2%	8.5%	100.0%
		% within ClassesEducation	14.4%	15.2%	14.3%	14.8%
Total		Count	174	191	35	400
		% within SourceOfMoneyForInvestment Other	43.5%	47.8%	8.8%	100.0%
		% within ClassesEducation	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.055[a]	2	.973
Likelihood Ratio	.055	2	.973
Linear-by-Linear Association	.012	1	.911
N of Valid Cases	400		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.16.

CROSSTAB and Chi-Square Test Between Class of Area and Other Variables

Crosstabs

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

MaritalStatus * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
MaritalStatus	Single	Count	1	2	3
		% within MaritalStatus	33.3%	66.7%	100.0%
		% within ClassesTotalArea	.3%	2.7%	.8%
	Married	Count	306	69	375
		% within MaritalStatus	81.6%	18.4%	100.0%
		% within ClassesTotalArea	93.9%	93.2%	93.8%
	Divorced	Count	7	1	8
		% within MaritalStatus	87.5%	12.5%	100.0%
		% within ClassesTotalArea	2.1%	1.4%	2.0%
	Widow	Count	12	2	14
		% within MaritalStatus	85.7%	14.3%	100.0%
		% within ClassesTotalArea	3.7%	2.7%	3.5%
Total		Count	326	74	400
		% within MaritalStatus	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.975[a]	3	.174
Likelihood Ratio	3.729	3	.292
Linear-by-Linear Association	.992	1	.319
N of Valid Cases	400		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .56.

SubOccupation * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
SubOccupation	none	Count	207	47	254
		% within SubOccupation	81.5%	18.5%	100.0%
		% within ClassesTotalArea	63.5%	63.5%	63.5%
	Labor inside the agricultural sector	Count	67	22	89
		% within SubOccupation	75.3%	24.7%	100.0%
		% within ClassesTotalArea	20.6%	29.7%	22.3%
	Labor outside the agricultural sector	Count	47	4	51
		% within SubOccupation	92.2%	7.8%	100.0%
		% within ClassesTotalArea	14.4%	5.4%	12.8%
	Family business	Count	5	1	6
		% within SubOccupation	83.3%	16.7%	100.0%
		% within ClassesTotalArea	1.5%	1.4%	1.5%
Total		Count	326	74	400
		% within SubOccupation	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.138[a]	3	.105
Likelihood Ratio	6.815	3	.078
Linear-by-Linear Association	.893	1	.345
N of Valid Cases	400		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 1.11.

TotalFamilyMember * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
TotalFamilyMember	2.00	Count	16	2	18
		% within TotalFamilyMember	88.9%	11.1%	100.0%
		% within ClassesTotalArea	4.9%	2.7%	4.5%
	3.00	Count	94	24	118
		% within TotalFamilyMember	79.7%	20.3%	100.0%
		% within ClassesTotalArea	28.8%	32.4%	29.5%
	4.00	Count	170	41	211
		% within TotalFamilyMember	80.6%	19.4%	100.0%
		% within ClassesTotalArea	52.1%	55.4%	52.8%
	5.00	Count	34	5	39
		% within TotalFamilyMember	87.2%	12.8%	100.0%
		% within ClassesTotalArea	10.4%	6.8%	9.8%
	6.00	Count	10	1	11
		% within TotalFamilyMember	90.9%	9.1%	100.0%
		% within ClassesTotalArea	3.1%	1.4%	2.8%
	7.00	Count	2	1	3
		% within TotalFamilyMember	66.7%	33.3%	100.0%
		% within ClassesTotalArea	.6%	1.4%	.8%
Total		Count	326	74	400
		% within TotalFamilyMember	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.956[a]	5	.707
Likelihood Ratio	3.168	5	.674
Linear-by-Linear Association	.142	1	.707
N of Valid Cases	400		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is .56.

ReasonRevenue * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
ReasonRevenue	No	Count	67	21	88
		% within ReasonRevenue	76.1%	23.9%	100.0%
		% within ClassesTotalArea	20.6%	28.4%	22.0%
	Yes	Count	259	53	312
		% within ReasonRevenue	83.0%	17.0%	100.0%
		% within ClassesTotalArea	79.4%	71.6%	78.0%
Total		Count	326	74	400
		% within ReasonRevenue	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.153[a]	1	.142		
Continuity Correction[b]	1.721	1	.190		
Likelihood Ratio	2.054	1	.152		
Fisher's Exact Test				.162	.097
Linear-by-Linear Association	2.147	1	.143		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 16.28.
b. Computed only for a 2x2 table

ReasonProductionProcess * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
ReasonProductionProcess	No	Count	290	61	351
		% within ReasonProductionProcess	82.6%	17.4%	100.0%
		% within ClassesTotalArea	89.0%	82.4%	87.8%
	Yes	Count	36	13	49
		% within ReasonProductionProcess	73.5%	26.5%	100.0%
		% within ClassesTotalArea	11.0%	17.6%	12.3%
Total		Count	326	74	400
		% within ReasonProductionProcess	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.388[a]	1	.122		
Continuity Correction[b]	1.820	1	.177		
Likelihood Ratio	2.202	1	.138		
Fisher's Exact Test				.167	.092
Linear-by-Linear Association	2.382	1	.123		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.07.
b. Computed only for a 2x2 table

ReasonSupportFromGoverment * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
ReasonSupportFromGoverment	No	Count	318	71	389
		% within ReasonSupportFromGoverment	81.7%	18.3%	100.0%
		% within ClassesTotalArea	97.5%	95.9%	97.3%
	Yes	Count	8	3	11
		% within ReasonSupportFromGoverment	72.7%	27.3%	100.0%
		% within ClassesTotalArea	2.5%	4.1%	2.8%
Total		Count	326	74	400
		% within ReasonSupportFromGoverment	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.577[a]	1	.447		
Continuity Correction[b]	.134	1	.714		
Likelihood Ratio	.522	1	.470		
Fisher's Exact Test				.434	.332
Linear-by-Linear Association	.576	1	.448		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.04.
b. Computed only for a 2x2 table

ReasonFollowTheOthers * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
ReasonFollowTheOthers	No	Count	312	71	383
		% within ReasonFollowTheOthers	81.5%	18.5%	100.0%
		% within ClassesTotalArea	95.7%	95.9%	95.8%
	Yes	Count	14	3	17
		% within ReasonFollowTheOthers	82.4%	17.6%	100.0%
		% within ClassesTotalArea	4.3%	4.1%	4.3%
Total		Count	326	74	400
		% within ReasonFollowTheOthers	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.009[a]	1	.926		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.009	1	.926		
Fisher's Exact Test				1.000	.612
Linear-by-Linear Association	.009	1	.926		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.15.
b. Computed only for a 2x2 table

ReasonOther * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
ReasonOther	No	Count	318	72	390
		% within ReasonOther	81.5%	18.5%	100.0%
		% within ClassesTotalArea	97.5%	97.3%	97.5%
	Yes	Count	8	2	10
		% within ReasonOther	80.0%	20.0%	100.0%
		% within ClassesTotalArea	2.5%	2.7%	2.5%
Total		Count	326	74	400
		% within ReasonOther	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.015[a]	1	.902		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.015	1	.903		
Fisher's Exact Test				1.000	.580
Linear-by-Linear Association	.015	1	.902		
N of Valid Cases	400				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.85.
b. Computed only for a 2x2 table

TotalFamilymemberWorkingInOilPalmProduction * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
TotalFamilymemberWorkingInOilPalmProduction	1.00	Count	78	19	97
		% within TotalFamilymemberWorkingInOilPalmProduction	80.4%	19.6%	100.0%
		% within ClassesTotalArea	23.9%	25.7%	24.3%
	2.00	Count	195	47	242
		% within TotalFamilymemberWorkingInOilPalmProduction	80.6%	19.4%	100.0%
		% within ClassesTotalArea	59.8%	63.5%	60.5%
	3.00	Count	52	8	60
		% within TotalFamilymemberWorkingInOilPalmProduction	86.7%	13.3%	100.0%
		% within ClassesTotalArea	16.0%	10.8%	15.0%
	5.00	Count	1	0	1
		% within TotalFamilymemberWorkingInOilPalmProduction	100.0%	.0%	100.0%
		% within ClassesTotalArea	.3%	.0%	.3%
Total		Count	326	74	400
		% within TotalFamilymemberWorkingInOilPalmProduction	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.502[a]	3	.682
Likelihood Ratio	1.771	3	.621
Linear-by-Linear Association	.900	1	.343
N of Valid Cases	400		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .19.

Buyer * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
Buyer	Middle man	Count	299	70	369
		% within Buyer	81.0%	19.0%	100.0%
		% within ClassesTotalArea	91.7%	94.6%	92.3%
	Mill	Count	23	3	26
		% within Buyer	88.5%	11.5%	100.0%
		% within ClassesTotalArea	7.1%	4.1%	6.5%
	Other	Count	4	1	5
		% within Buyer	80.0%	20.0%	100.0%
		% within ClassesTotalArea	1.2%	1.4%	1.3%
Total		Count	326	74	400
		% within Buyer	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.897[a]	2	.638
Likelihood Ratio	.999	2	.607
Linear-by-Linear Association	.426	1	.514
N of Valid Cases	400		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .93.

ReasonToSellOilPalmToBuyer * ClassesTotalArea

Crosstab

			ClassesTotalArea		Total
			Smallholder	Largeholder	
ReasonToSellOilPalmToBuyer	better price	Count	272	58	330
		% within ReasonToSellOilPalmToBuyer	82.4%	17.6%	100.0%
		% within ClassesTotalArea	83.4%	78.4%	82.5%
	friendship	Count	14	6	20
		% within ReasonToSellOilPalmToBuyer	70.0%	30.0%	100.0%
		% within ClassesTotalArea	4.3%	8.1%	5.0%
	more comfortable for transportation	Count	16	4	20
		% within ReasonToSellOilPalmToBuyer	80.0%	20.0%	100.0%
		% within ClassesTotalArea	4.9%	5.4%	5.0%
	contract	Count	11	3	14
		% within ReasonToSellOilPalmToBuyer	78.6%	21.4%	100.0%
		% within ClassesTotalArea	3.4%	4.1%	3.5%
	other	Count	13	3	16
		% within ReasonToSellOilPalmToBuyer	81.3%	18.8%	100.0%
		% within ClassesTotalArea	4.0%	4.1%	4.0%
Total		Count	326	74	400
		% within ReasonToSellOilPalmToBuyer	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.051[a]	4	.726
Likelihood Ratio	1.838	4	.766
Linear-by-Linear Association	.295	1	.587
N of Valid Cases	400		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 2.59.

SourceOfMoneyForInvestmentSelfFunding * ClassesTotalArea

Crosstab

			ClassesTotalArea		
			Smallholder	Largeholder	Total
SourceOfMoneyForInvestment SelfFunding	Yes	Count	326	74	400
		% within SourceOfMoneyForInvestment SelfFunding	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%
Total		Count	326	74	400
		% within SourceOfMoneyForInvestment SelfFunding	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value
Pearson Chi-Square	.[a]
N of Valid Cases	400

a. No statistics are computed because SourceOfMoneyForInvestmentSelfFunding is a constant.

SourceOfMoneyForInvestmentGovernment * ClassesTotalArea

Crosstab

			ClassesTotalArea		Total
			Smallholder	Largeholder	
SourceOfMoneyForInvestment Government	No	Count	225	54	279
		% within SourceOfMoneyForInvestment Government	80.6%	19.4%	100.0%
		% within ClassesTotalArea	69.0%	73.0%	69.8%
	Yes	Count	101	20	121
		% within SourceOfMoneyForInvestment Government	83.5%	16.5%	100.0%
		% within ClassesTotalArea	31.0%	27.0%	30.3%
Total		Count	326	74	400
		% within SourceOfMoneyForInvestment Government	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.447[a]	1	.504		
Continuity Correction[b]	.279	1	.597		
Likelihood Ratio	.455	1	.500		
Fisher's Exact Test				.576	.302
Linear-by-Linear Association	.446	1	.504		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 22.39.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentBank * ClassesTotalArea

Crosstab

			ClassesTotalArea		Total
			Smallholder	Largeholder	
SourceOfMoneyForInvestmentBank	No	Count	68	16	84
		% within SourceOfMoneyForInvestmentBank	81.0%	19.0%	100.0%
		% within ClassesTotalArea	20.9%	21.6%	21.0%
	Yes	Count	258	58	316
		% within SourceOfMoneyForInvestmentBank	81.6%	18.4%	100.0%
		% within ClassesTotalArea	79.1%	78.4%	79.0%
Total		Count	326	74	400
		% within SourceOfMoneyForInvestmentBank	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.021[a]	1	.884		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.021	1	.885		
Fisher's Exact Test				.875	.497
Linear-by-Linear Association	.021	1	.885		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.54.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentLoanShark * ClassesTotalArea

Crosstab

			ClassesTotalArea		Total
			Smallholder	Largeholder	
SourceOfMoneyForInvestmentLoanShark	No	Count	324	74	398
		% within SourceOfMoneyForInvestmentLoanShark	81.4%	18.6%	100.0%
		% within ClassesTotalArea	99.4%	100.0%	99.5%
	Yes	Count	2	0	2
		% within SourceOfMoneyForInvestmentLoanShark	100.0%	.0%	100.0%
		% within ClassesTotalArea	.6%	.0%	.5%
Total		Count	326	74	400
		% within SourceOfMoneyForInvestmentLoanShark	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.456[a]	1	.499		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.821	1	.365		
Fisher's Exact Test				1.000	.664
Linear-by-Linear Association	.455	1	.500		
N of Valid Cases	400				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .37.
b. Computed only for a 2x2 table

SourceOfMoneyForInvestmentOther * ClassesTotalArea

Crosstab

			ClassesTotalArea		Total
			Smallholder	Largeholder	
SourceOfMoneyForInvestmentOther	No	Count	279	62	341
		% within SourceOfMoneyForInvestmentOther	81.8%	18.2%	100.0%
		% within ClassesTotalArea	85.6%	83.8%	85.3%
	Yes	Count	47	12	59
		% within SourceOfMoneyForInvestmentOther	79.7%	20.3%	100.0%
		% within ClassesTotalArea	14.4%	16.2%	14.8%
Total		Count	326	74	400
		% within SourceOfMoneyForInvestmentOther	81.5%	18.5%	100.0%
		% within ClassesTotalArea	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.155[a]	1	.694		
Continuity Correction[b]	.045	1	.832		
Likelihood Ratio	.152	1	.697		
Fisher's Exact Test				.717	.406
Linear-by-Linear Association	.155	1	.694		
N of Valid Cases	400				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.92.
b. Computed only for a 2x2 table

ANOVA and F-Test between Gender and Other Variables

Oneway

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

Descriptives

						95% Confidence Interval for Mean		Minimum	Maximum
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound		
TotalFarmIncome	Male	304	302910.2448	375022.43442	21509.01175	260584.2931	345236.1964	45990.00	2540000.00
	Female	96	296017.0959	401448.39350	40972.65509	214676.0913	377358.1006	67900.75	2516800.00
	Total	400	301255.8891	381029.52907	19051.47645	263802.0715	338709.7066	45990.00	2540000.00
TotalHouseholdIncome	Male	304	305422.0442	370619.11448	21256.46403	263593.0621	347251.0264	21500.00	3200000.00
	Female	96	259716.2698	225279.57032	22992.49987	214070.3864	305362.1532	23500.00	1235000.00
	Total	400	294452.6584	341724.15111	17086.20756	260862.4166	328042.9002	21500.00	3200000.00
TotalProductionOfOilPalmTonPerYear	Male	304	64.0518	58.39283	3.34906	57.4615	70.6422	1.82	231.20
	Female	96	86.6162	336.78004	34.37247	18.3783	154.8542	6.95	3320.00
	Total	400	69.4673	172.30029	8.61501	52.5308	86.4038	1.82	3320.00
Howlongforplantation	Male	304	14.6447	5.40432	.30996	14.0348	15.2547	1.00	25.00
	Female	96	14.3229	6.15843	.62854	13.0751	15.5707	1.00	30.00
	Total	400	14.5675	5.58825	.27941	14.0182	15.1168	1.00	30.00
OilpalmIncome	Male	304	278498.2185	281455.35218	16142.57154	246732.4772	310263.9598	26500.00	2537595.00
	Female	96	288616.0683	291768.22099	29778.46936	229498.3322	347733.8045	10000.00	2103000.00
	Total	400	280926.5025	283627.95052	14181.39753	253046.9060	308806.0989	10000.00	2537595.00
CostLabor	Male	304	2137.5308	1446.02580	82.93527	1974.3288	2300.7328	1250.40	19852.24
	Female	96	2029.0289	68.00542	6.94077	2015.2497	2042.8080	1700.00	2310.00
	Total	400	2111.4903	1261.40754	63.07038	1987.4985	2235.4821	1250.40	19852.24
Maintenance	Male	304	841.6652	21.41795	1.22840	839.2479	844.0825	800.00	899.00
	Female	96	844.0188	18.62117	1.90052	840.2458	847.7917	804.55	893.10
	Total	400	842.2300	20.78292	1.03915	840.1871	844.2729	800.00	899.00
Harvest	Male	304	1270.4636	26.85841	1.54044	1267.4323	1273.4949	1200.00	1563.00
	Female	96	1265.4490	14.66738	1.49698	1262.4771	1268.4208	1225.00	1299.25
	Total	400	1269.2601	24.56890	1.22844	1266.8451	1271.6751	1200.00	1563.00
Input	Male	304	3479.8212	17.69960	1.01514	3477.8236	3481.8188	3415.00	3587.00
	Female	96	3477.0252	20.57532	2.09996	3472.8563	3481.1942	3411.00	3586.00
	Total	400	3479.1502	18.44253	.92213	3477.3373	3480.9630	3411.00	3587.00
Fertilizer	Male	304	2958.6166	31.21767	1.79046	2955.0933	2962.1399	2550.00	2999.00
	Female	96	2953.5059	45.05679	4.59859	2944.3766	2962.6353	2595.00	2998.00
	Total	400	2957.3901	35.04573	1.75229	2953.9452	2960.8349	2550.00	2999.00
Pesticidesandweedprevention	Male	304	361.3397	22.98943	1.31853	358.7451	363.9343	35.00	395.55
	Female	96	356.2157	35.75492	3.64922	348.9711	363.4603	33.00	394.00
	Total	400	360.1100	26.65592	1.33280	357.4898	362.7301	33.00	395.55
Fuelandlubrication	Male	304	84.0052	3.27785	.18800	83.6352	84.3751	34.22	89.65
	Female	96	83.7753	5.31828	.54280	82.6977	84.8529	34.53	88.55
	Total	400	83.9500	3.86047	.19302	83.5705	84.3295	34.22	89.65
Agriculturalmaterialsandsupplies	Male	304	69.5163	1.45902	.08368	69.3516	69.6810	63.55	75.50
	Female	96	69.4483	1.61121	.16444	69.1219	69.7748	65.00	75.55
	Total	400	69.5000	1.49516	.07476	69.3530	69.6470	63.55	75.55
Agriculturalequipmentrepair	Male	304	8.1945	.47330	.02715	8.1411	8.2480	6.10	9.22
	Female	96	8.2173	.46434	.04739	8.1232	8.3114	6.55	9.02
	Total	400	8.2000	.47069	.02353	8.1537	8.2463	6.10	9.22
Investmentinterest	Male	304	419.3879	2.67273	.15329	419.0863	419.6896	403.22	425.62
	Female	96	418.9800	3.38195	.34517	418.2948	419.6652	400.25	425.22
	Total	400	419.2900	2.85979	.14299	419.0089	419.5711	400.25	425.62
FixedCost	Male	304	941.7076	5.11769	.29352	941.1300	942.2852	930.25	958.65
	Female	96	941.2595	4.64122	.47369	940.3191	942.1999	931.22	956.52
	Total	400	941.6000	5.00547	.25027	941.1080	942.0920	930.25	958.65
Landrental	Male	304	515.4766	29.30470	1.68074	512.1692	518.7840	8.66	524.11
	Female	96	517.2821	2.78601	.28435	516.7176	517.8466	510.24	523.33
	Total	400	515.9100	25.58495	1.27925	513.3950	518.4249	8.66	524.11
Agriculturalequipmentdepreciation	Male	304	37.1061	17.22034	.98765	35.1625	39.0496	30.14	332.20
	Female	96	35.7475	3.25348	.33206	35.0883	36.4067	30.11	40.15
	Total	400	36.7800	15.10132	.75507	35.2956	38.2644	30.11	332.20
Investmentinterestinagriculturalequipment	Male	304	3.3233	.27801	.01594	3.2919	3.3547	3.00	5.00
	Female	96	3.3096	.25673	.02620	3.2576	3.3616	3.00	3.95
	Total	400	3.3200	.27280	.01364	3.2932	3.3468	3.00	5.00
	Male	304	385.6721	3.60067	.20651	385.2657	386.0785	348.62	390.85
	Female	96	385.3300	4.00838	.40910	384.5178	386.1422	357.26	392.78

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
AverageCostBeforeYield	Total	400	385.5900	3.70032	.18502	385.2263	385.9537	348.62	392.78
Totalcost	Male	304	6951.6062	2.54051	.14571	6951.3195	6951.8929	6940.15	6961.25
	Female	96	6951.2894	2.63354	.26878	6950.7558	6951.8230	6945.25	6957.51
	Total	400	6951.5302	2.56339	.12817	6951.2782	6951.7821	6940.15	6961.25
Totalcostperkilogram	Male	304	2.1927	.23510	.01348	2.1662	2.2193	1.56	2.98
	Female	96	2.1397	.18328	.01871	2.1026	2.1768	1.59	2.76
	Total	400	2.1800	.22469	.01123	2.1579	2.2021	1.56	2.98
Availablecostperkg	Male	304	1.8974	.37482	.02150	1.8551	1.9397	1.00	2.98
	Female	96	1.8665	.37422	.03819	1.7906	1.9423	1.02	2.65
	Total	400	1.8900	.37444	.01872	1.8532	1.9268	1.00	2.98
AverageYield	Male	304	3184.8447	48.64485	2.78997	3179.3545	3190.3348	3133.20	3995.00
	Female	96	3189.6574	83.37481	8.50941	3172.7641	3206.5507	3155.00	3990.00
	Total	400	3185.9997	58.79032	2.93952	3180.2209	3191.7786	3133.20	3995.00
AveragePrice	Male	304	3.3886	.23432	.01344	3.3622	3.4151	3.00	3.97
	Female	96	3.3944	.23667	.02415	3.3464	3.4423	3.01	3.95
	Total	400	3.3900	.23460	.01173	3.3669	3.4131	3.00	3.97
Totalincome	Male	304	10806.1333	424.83232	24.36580	10758.1857	10854.0809	10601.21	18065.33
	Female	96	10782.8443	76.81566	7.83996	10767.2800	10798.4086	10601.33	10895.55
	Total	400	10800.5440	372.23948	18.61197	10763.9542	10837.1337	10601.21	18065.33

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TotalFarmIncome	Between Groups	3.467E9	1	3.467E9	.024	.877
	Within Groups	5.792E13	398	1.455E11		
	Total	5.793E13	399			
TotalHouseholdIncome	Between Groups	1.524E11	1	1.524E11	1.306	.254
	Within Groups	4.644E13	398	1.167E11		
	Total	4.659E13	399			
TotalProductionOfOilPalmTonPerYear	Between Groups	37147.810	1	37147.810	1.252	.264
	Within Groups	11808121.341	398	29668.647		
	Total	11845269.151	399			
Howlongforplantation	Between Groups	7.556	1	7.556	.242	.623
	Within Groups	12452.621	398	31.288		
	Total	12460.178	399			
OilpalmIncome	Between Groups	7.469E9	1	7.469E9	.093	.761
	Within Groups	3.209E13	398	8.063E10		
	Total	3.210E13	399			
CostLabor	Between Groups	858934.001	1	858934.001	.539	.463
	Within Groups	6.340E8	398	1592988.712		
	Total	6.349E8	399			
Maintenance	Between Groups	404.150	1	404.150	.936	.334
	Within Groups	171935.824	398	432.000		
	Total	172339.974	399			
Harvest	Between Groups	1834.712	1	1834.712	3.055	.081
	Within Groups	239013.979	398	600.538		
	Total	240848.690	399			
Input	Between Groups	570.377	1	570.377	1.680	.196
	Within Groups	135140.193	398	339.548		
	Total	135710.569	399			
Fertilizer	Between Groups	1905.642	1	1905.642	1.554	.213
	Within Groups	488147.481	398	1226.501		
	Total	490053.123	399			
Pesticidesandweedprevention	Between Groups	1915.573	1	1915.573	2.707	.101
	Within Groups	281589.053	398	707.510		
	Total	283504.626	399			
Fuelandlubrication	Between Groups	3.855	1	3.855	.258	.612
	Within Groups	5942.521	398	14.931		

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
	Total	5946.376	399			
Agriculturalmaterialsandsupplies	Between Groups	.337	1	.337	.151	.698
	Within Groups	891.632	398	2.240		
	Total	891.970	399			
Agriculturalequipmentrepair	Between Groups	.038	1	.038	.170	.680
	Within Groups	88.359	398	.222		
	Total	88.397	399			
Investmentinterest	Between Groups	12.141	1	12.141	1.486	.224
	Within Groups	3251.048	398	8.168		
	Total	3263.189	399			
FixedCost	Between Groups	14.649	1	14.649	.584	.445
	Within Groups	9982.188	398	25.081		
	Total	9996.837	399			
Landrental	Between Groups	237.821	1	237.821	.363	.547
	Within Groups	260943.372	398	655.637		
	Total	261181.193	399			
Agriculturalequipmentdepreciation	Between Groups	134.663	1	134.663	.590	.443
	Within Groups	90857.211	398	228.284		
	Total	90991.874	399			
Investmentinterestinagriculturalequipment	Between Groups	.014	1	.014	.184	.668
	Within Groups	29.680	398	.075		
	Total	29.694	399			
AverageCostBeforeYield	Between Groups	8.540	1	8.540	.623	.430
	Within Groups	5454.728	398	13.705		
	Total	5463.268	399			
Totalcost	Between Groups	7.324	1	7.324	1.115	.292
	Within Groups	2614.502	398	6.569		
	Total	2621.826	399			
Totalcostperkilogram	Between Groups	.205	1	.205	4.098	.044
	Within Groups	19.939	398	.050		
	Total	20.144	399			
Availablecostperkg	Between Groups	.070	1	.070	.499	.480
	Within Groups	55.873	398	.140		
	Total	55.943	399			
AverageYield	Between Groups	1689.923	1	1689.923	.488	.485
	Within Groups	1377374.506	398	3460.740		
	Total	1379064.429	399			
AveragePrice	Between Groups	.002	1	.002	.044	.834
	Within Groups	21.957	398	.055		
	Total	21.960	399			
Totalincome	Between Groups	39572.039	1	39572.039	.285	.594
	Within Groups	55246758.467	398	138810.951		
	Total	55286330.506	399			

ANOVA and F-Test between Class of Age and Other Variables

Oneway

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
TotalFarmIncome	Young farmers	194	273824.8494	299504.47907	21503.16843	231413.4692	316236.2296	48690.93	2516800.00
	Old farmers	206	327089.0041	443556.02698	30904.01277	266158.5444	388019.4638	45990.00	2540000.00
	Total	400	301255.8891	381029.52907	19051.47645	263802.0715	338709.7066	45990.00	2540000.00
TotalHouseholdIncome	Young farmers	194	332023.2131	362599.97207	26033.16083	280677.1854	383369.2409	23510.00	2500000.00
	Old farmers	206	259070.6796	317661.10018	22132.49759	215434.1699	302707.1893	21500.00	3200000.00
	Total	400	294452.6584	341724.15111	17086.20756	260862.4166	328042.9002	21500.00	3200000.00
TotalProductionOfOilPalmTonPerYear	Young farmers	194	63.4480	59.05268	4.23974	55.0858	71.8101	2.20	231.20
	Old farmers	206	75.1360	233.30695	16.25527	43.0870	107.1849	1.82	3320.00
	Total	400	69.4673	172.30029	8.61501	52.5308	86.4038	1.82	3320.00
Howlongforplantation	Young farmers	194	14.7680	5.85249	.42018	13.9393	15.5968	1.00	30.00
	Old farmers	206	14.3786	5.33487	.37170	13.6458	15.1115	1.00	26.00
	Total	400	14.5675	5.58825	.27941	14.0182	15.1168	1.00	30.00
OilpalmIncome	Young farmers	194	290824.4522	322710.40010	23169.25646	245126.9937	336521.9106	32599.00	2537595.00
	Old farmers	206	271605.1323	241551.58495	16829.69639	238423.6440	304786.6206	10000.00	2103000.00
	Total	400	280926.5025	283627.95052	14181.39753	253046.9060	308806.0989	10000.00	2537595.00
CostLabor	Young farmers	194	2120.5406	1281.18551	91.98376	1939.1181	2301.9631	1650.00	19852.24
	Old farmers	206	2102.9672	1245.55870	86.78219	1931.8672	2274.0673	1250.40	19852.24
	Total	400	2111.4903	1261.40754	63.07038	1987.4985	2235.4821	1250.40	19852.24
Maintenance	Young farmers	194	841.5947	20.70337	1.48642	838.6630	844.5264	800.10	899.00
	Old farmers	206	842.8284	20.89023	1.45549	839.9587	845.6980	800.00	895.00
	Total	400	842.2300	20.78292	1.03915	840.1871	844.2729	800.00	899.00
Harvest	Young farmers	194	1269.2262	25.36833	1.82134	1265.6340	1272.8185	1225.00	1563.00
	Old farmers	206	1269.2920	23.85349	1.66195	1266.0153	1272.5687	1200.00	1548.00
	Total	400	1269.2601	24.56890	1.22844	1266.8451	1271.6751	1200.00	1563.00
Input	Young farmers	194	3479.3031	16.93607	1.21594	3476.9049	3481.7014	3411.00	3578.50
	Old farmers	206	3479.0061	19.79695	1.37932	3476.2866	3481.7256	3415.00	3587.00
	Total	400	3479.1502	18.44253	.92213	3477.3373	3480.9630	3411.00	3587.00
Fertilizer	Young farmers	194	2958.9425	33.85360	2.43055	2954.1486	2963.7363	2595.00	2999.00
	Old farmers	206	2955.9281	36.15377	2.51895	2950.9617	2960.8944	2550.00	2999.00
	Total	400	2957.3901	35.04573	1.75229	2953.9452	2960.8349	2550.00	2999.00
Pesticidesandweedprevention	Young farmers	194	362.0786	13.10229	.94069	360.2233	363.9340	320.00	395.55
	Old farmers	206	358.2560	34.84547	2.42780	353.4693	363.0426	33.00	395.55
	Total	400	360.1100	26.65592	1.33280	357.4898	362.7301	33.00	395.55
Fuelandlubrication	Young farmers	194	83.6845	5.29569	.38021	82.9346	84.4344	34.22	89.65
	Old farmers	206	84.2000	1.57305	.10960	83.9839	84.4161	80.00	87.00
	Total	400	83.9500	3.86047	.19302	83.5705	84.3295	34.22	89.65
Agriculturalmaterialsandsupplies	Young farmers	194	69.3621	1.60879	.11550	69.1343	69.5899	64.59	75.55
	Old farmers	206	69.6299	1.37092	.09552	69.4415	69.8182	63.55	75.50
	Total	400	69.5000	1.49516	.07476	69.3530	69.6470	63.55	75.55
Agriculturalequipmentrepair	Young farmers	194	8.2334	.47240	.03392	8.1665	8.3003	6.20	9.01
	Old farmers	206	8.1685	.46803	.03261	8.1043	8.2328	6.10	9.22
	Total	400	8.2000	.47069	.02353	8.1537	8.2463	6.10	9.22
Investmentinterest	Young farmers	194	419.2471	3.16378	.22715	418.7991	419.6951	400.25	425.44
	Old farmers	206	419.3305	2.54775	.17751	418.9805	419.6805	410.22	425.62
	Total	400	419.2900	2.85979	.14299	419.0089	419.5711	400.25	425.62
FixedCost	Young farmers	194	941.0853	4.93349	.35420	940.3867	941.7839	930.25	958.65
	Old farmers	206	942.0848	5.03623	.35089	941.3929	942.7766	930.25	957.66
	Total	400	941.6000	5.00547	.25027	941.1080	942.0920	930.25	958.65
Landrental	Young farmers	194	514.5510	36.62466	2.62950	509.3648	519.7373	8.66	524.11
	Old farmers	206	517.1897	2.79550	.19477	516.8057	517.5737	509.45	524.11
	Total	400	515.9099	25.58495	1.27925	513.3950	518.4249	8.66	524.11
Agriculturalequipmentdepreciation	Young farmers	194	36.2382	2.84330	.20414	35.8356	36.6408	30.14	40.66
	Old farmers	206	37.2902	20.87372	1.45434	34.4229	40.1576	30.11	332.20
	Total	400	36.7800	15.10132	.75507	35.2956	38.2644	30.11	332.20
Investmentinterestin	Young farmers	194	3.3392	.29146	.02093	3.2979	3.3804	3.00	5.00
	Old farmers	206	3.3019	.25337	.01765	3.2671	3.3367	3.00	3.97

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
agriculturalequipment	Total	400	3.3200	.27280	.01364	3.2932	3.3468	3.00	5.00
AverageCostBeforeYield	Young farmers	194	385.4720	3.32294	.23857	385.0015	385.9426	357.26	390.61
	Old farmers	206	385.7011	4.02851	.28068	385.1478	386.2545	348.62	392.78
	Total	400	385.5900	3.70032	.18502	385.2263	385.9537	348.62	392.78
Totalcost	Young farmers	194	6951.4971	2.65480	.19060	6951.1211	6951.8730	6940.15	6961.25
	Old farmers	206	6951.5614	2.48032	.17281	6951.2206	6951.9021	6940.15	6961.25
	Total	400	6951.5302	2.56339	.12817	6951.2782	6951.7821	6940.15	6961.25
Totalcostperkilogram	Young farmers	194	2.1684	.22403	.01608	2.1366	2.2001	1.59	2.98
	Old farmers	206	2.1910	.22530	.01570	2.1600	2.2219	1.56	2.95
	Total	400	2.1800	.22469	.01123	2.1579	2.2021	1.56	2.98
Availablecostperkg	Young farmers	194	1.8601	.39856	.02862	1.8037	1.9165	1.00	2.70
	Old farmers	206	1.9182	.34885	.02431	1.8702	1.9661	1.01	2.98
	Total	400	1.8900	.37444	.01872	1.8532	1.9268	1.00	2.98
AverageYield	Young farmers	194	3181.6949	13.80057	.99082	3179.7407	3183.6492	3133.20	3262.20
	Old farmers	206	3190.0537	80.70802	5.62319	3178.9670	3201.1404	3154.00	3995.00
	Total	400	3185.9997	58.79032	2.93952	3180.2209	3191.7786	3133.20	3995.00
AveragePrice	Young farmers	194	3.3961	.24566	.01764	3.3613	3.4309	3.00	3.96
	Old farmers	206	3.3842	.22413	.01562	3.3534	3.4150	3.00	3.97
	Total	400	3.3900	.23460	.01173	3.3669	3.4131	3.00	3.97
Totalincome	Young farmers	194	10785.1011	70.47215	5.05961	10775.1219	10795.0804	10601.33	10897.54
	Old farmers	206	10815.0872	514.36911	35.83779	10744.4293	10885.7451	10601.21	18065.33
	Total	400	10800.5439	372.23948	18.61197	10763.9542	10837.1337	10601.21	18065.33

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TotalFarmIncome	Between Groups	2.835E11	1	2.835E11	1.957	.163
	Within Groups	5.764E13	398	1.448E11		
	Total	5.793E13	399			
TotalHouseholdIncome	Between Groups	5.317E11	1	5.317E11	4.594	.033
	Within Groups	4.606E13	398	1.157E11		
	Total	4.659E13	399			
TotalProductionOfOilPalmTonPerYear	Between Groups	13648.691	1	13648.691	.459	.498
	Within Groups	11831620.460	398	29727.690		
	Total	11845269.151	399			
Howlongforplantation	Between Groups	15.150	1	15.150	.484	.487
	Within Groups	12445.028	398	31.269		
	Total	12460.177	399			
OilpalmIncome	Between Groups	3.690E10	1	3.690E10	.458	.499
	Within Groups	3.206E13	398	8.055E10		
	Total	3.210E13	399			
CostLabor	Between Groups	30854.594	1	30854.594	.019	.889
	Within Groups	6.348E8	398	1595069.314		
	Total	6.349E8	399			
Maintenance	Between Groups	152.057	1	152.057	.351	.554
	Within Groups	172187.917	398	432.633		
	Total	172339.974	399			
Harvest	Between Groups	.432	1	.432	.001	.979
	Within Groups	240848.258	398	605.146		
	Total	240848.690	399			
Input	Between Groups	8.815	1	8.815	.026	.872
	Within Groups	135701.755	398	340.959		
	Total	135710.569	399			
Fertilizer	Between Groups	907.853	1	907.853	.739	.391
	Within Groups	489145.270	398	1229.008		
	Total	490053.123	399			
	Between Groups	1459.941	1	1459.941	2.060	.152

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Pesticidesandweedprevention	Within Groups	282044.686	398	708.655		
	Total	283504.626	399			
Fuelandlubrication	Between Groups	26.546	1	26.546	1.785	.182
	Within Groups	5919.830	398	14.874		
	Total	5946.376	399			
Agriculturalmaterialsandsupplies	Between Groups	7.162	1	7.162	3.222	.073
	Within Groups	884.808	398	2.223		
	Total	891.970	399			
Agriculturalequipmentrepair	Between Groups	.420	1	.420	1.901	.169
	Within Groups	87.976	398	.221		
	Total	88.397	399			
Investmentinterest	Between Groups	.695	1	.695	.085	.771
	Within Groups	3262.493	398	8.197		
	Total	3263.189	399			
FixedCost	Between Groups	99.800	1	99.800	4.013	.046
	Within Groups	9897.037	398	24.867		
	Total	9996.837	399			
Landrental	Between Groups	695.635	1	695.635	1.063	.303
	Within Groups	260485.558	398	654.486		
	Total	261181.193	399			
Agriculturalequipmentdepreciation	Between Groups	110.575	1	110.575	.484	.487
	Within Groups	90881.299	398	228.345		
	Total	90991.874	399			
Investmentinterestinagriculturalequipment	Between Groups	.139	1	.139	1.865	.173
	Within Groups	29.555	398	.074		
	Total	29.694	399			
AverageCostBeforeYield	Between Groups	5.245	1	5.245	.382	.537
	Within Groups	5458.023	398	13.714		
	Total	5463.268	399			
Totalcost	Between Groups	.413	1	.413	.063	.802
	Within Groups	2621.413	398	6.586		
	Total	2621.826	399			
Totalcostperkilogram	Between Groups	.051	1	.051	1.013	.315
	Within Groups	20.093	398	.050		
	Total	20.144	399			
Availablecostperkg	Between Groups	.337	1	.337	2.410	.121
	Within Groups	55.606	398	.140		
	Total	55.943	399			
AverageYield	Between Groups	6980.648	1	6980.648	2.025	.156
	Within Groups	1372083.781	398	3447.447		
	Total	1379064.429	399			
AveragePrice	Between Groups	.014	1	.014	.257	.612
	Within Groups	21.946	398	.055		
	Total	21.960	399			
Totalincome	Between Groups	89835.397	1	89835.397	.648	.421
	Within Groups	55196495.108	398	138684.661		
	Total	55286330.506	399			

ANOVA and F-Test between Class of Education and Other Variables

Oneway

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
TotalFarmIncome	None or primary	174	331579.6877	442867.66183	33573.71080	265312.8597	397846.5158	54900.00	2540000.00
	Secondary and high school	191	276725.8787	332565.55378	24063.59893	229259.7516	324192.0057	45990.00	2410000.00
	Graduate and above	35	284367.0609	281724.73742	47620.17210	187591.2276	381142.8941	48690.93	1578500.00
	Total	400	301255.8891	381029.52907	19051.47645	263802.0715	338709.7066	45990.00	2540000.00
TotalHouseholdIncome	None or primary	174	281920.6448	280664.07533	21277.08864	239924.5371	323916.7525	23500.00	2150300.00
	Secondary and high school	191	296250.2683	364155.69022	26349.38098	244275.3718	348225.1649	21500.00	3200000.00
	Graduate and above	35	346944.8543	474205.43427	80155.34808	184049.5883	509840.1203	25430.00	2500000.00
	Total	400	294452.6584	341724.15111	17086.20756	260862.4166	328042.9002	21500.00	3200000.00
TotalProductionOfOilPalmTonPerYear	None or primary	174	87.2773	254.43347	19.28855	49.2061	125.3485	1.82	3320.00
	Secondary and high school	191	56.9770	51.67834	3.73931	49.6011	64.3529	2.20	231.20
	Graduate and above	35	49.0874	33.83495	5.71915	37.4647	60.7101	4.00	164.56
	Total	400	69.4673	172.30029	8.61501	52.5308	86.4038	1.82	3320.00
Howlongforplantation	None or primary	174	14.1954	5.78585	.43862	13.3297	15.0611	1.00	25.00
	Secondary and high school	191	15.0733	5.33655	.38614	14.3116	15.8350	1.00	30.00
	Graduate and above	35	13.6571	5.83066	.98556	11.6542	15.6600	3.00	25.00
	Total	400	14.5675	5.58825	.27941	14.0182	15.1168	1.00	30.00
OilpalmIncome	None or primary	174	273005.6051	241949.39888	18342.13659	236802.4216	309208.7886	26500.00	2100000.00
	Secondary and high school	191	288585.0246	321666.83028	23274.99498	242674.4410	334495.6081	32599.00	2537595.00
	Graduate and above	35	278511.0286	259445.51552	43854.29626	189388.3758	367633.6814	10000.00	1201002.00
	Total	400	280926.5024	283627.95052	14181.39753	253046.9060	308806.0989	10000.00	2537595.00
CostLabor	None or primary	174	2023.3698	76.69946	5.81457	2011.8931	2034.8464	1250.40	2112.00
	Secondary and high school	191	2211.1849	1821.02213	131.76454	1951.2756	2471.0941	1500.00	19852.24
	Graduate and above	35	2005.5280	65.33365	11.04340	1983.0851	2027.9709	1800.00	2110.00
	Total	400	2111.4903	1261.40754	63.07038	1987.4985	2235.4821	1250.40	19852.24
Maintenance	None or primary	174	841.9674	20.80076	1.57690	838.8549	845.0798	800.00	895.00
	Secondary and high school	191	842.5129	19.80449	1.43300	839.6863	845.3396	800.10	899.00
	Graduate and above	35	841.9920	25.97347	4.39032	833.0698	850.9142	800.00	893.10
	Total	400	842.2300	20.78292	1.03915	840.1871	844.2729	800.00	899.00
Harvest	None or primary	174	1268.0198	14.19625	1.07622	1265.8956	1270.1440	1200.00	1298.56
	Secondary and high school	191	1268.5128	13.39795	.96944	1266.6005	1270.4250	1225.00	1302.22
	Graduate and above	35	1279.5043	70.25795	11.87576	1255.3698	1303.6387	1236.25	1563.00

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
	Total	400	1269.2601	24.56890	1.22844	1266.8451	1271.6751	1200.00	1563.00
Input	None or primary	174	3476.7599	13.66452	1.03590	3474.7153	3478.8046	3411.00	3502.22
	Secondary and high school	191	3481.7093	22.43767	1.62353	3478.5068	3484.9117	3415.00	3587.00
	Graduate and above	35	3477.0677	12.55120	2.12154	3472.7562	3481.3792	3456.25	3499.00
	Total	400	3479.1502	18.44253	.92213	3477.3373	3480.9630	3411.00	3587.00
Fertilizer	None or primary	174	2954.9058	38.71942	2.93531	2949.1122	2960.6994	2550.00	2999.00
	Secondary and high school	191	2958.8308	33.35125	2.41321	2954.0707	2963.5909	2595.00	2999.00
	Graduate and above	35	2961.8780	22.47830	3.79953	2954.1564	2969.5996	2911.00	2995.00
	Total	400	2957.3901	35.04573	1.75229	2953.9452	2960.8349	2550.00	2999.00
Pesticides andweedprevention	None or primary	174	359.8914	27.83247	2.10997	355.7268	364.0560	33.00	395.00
	Secondary and high school	191	360.5274	27.43439	1.98508	356.6118	364.4430	35.00	395.55
	Graduate and above	35	358.9183	13.71642	2.31850	354.2065	363.6300	325.25	385.00
	Total	400	360.1100	26.65592	1.33280	357.4898	362.7301	33.00	395.55
Fuelandlubrication	None or primary	174	84.0793	4.08739	.30986	83.4677	84.6909	34.22	88.55
	Secondary and high school	191	83.7241	3.94426	.28540	83.1611	84.2870	34.53	88.00
	Graduate and above	35	84.5400	1.48913	.25171	84.0285	85.0515	82.22	89.65
	Total	400	83.9500	3.86047	.19302	83.5705	84.3295	34.22	89.65
Agriculturalmaterialsandsupplies	None or primary	174	69.6266	1.60115	.12138	69.3870	69.8661	65.00	75.55
	Secondary and high school	191	69.3902	1.44500	.10456	69.1839	69.5964	63.55	75.50
	Graduate and above	35	69.4703	1.17081	.19790	69.0681	69.8725	65.25	72.11
	Total	400	69.5000	1.49516	.07476	69.3530	69.6470	63.55	75.55
Agriculturalequipmentrepair	None or primary	174	8.1953	.48276	.03660	8.1231	8.2676	6.55	9.22
	Secondary and high school	191	8.2341	.44134	.03193	8.1711	8.2971	6.20	9.01
	Graduate and above	35	8.0371	.54002	.09128	7.8516	8.2226	6.10	8.95
	Total	400	8.2000	.47069	.02353	8.1537	8.2463	6.10	9.22
Investmentinterest	None or primary	174	419.0479	3.13645	.23777	418.5786	419.5172	400.25	425.22
	Secondary and high school	191	419.4770	2.51340	.18186	419.1182	419.8357	409.55	425.55
	Graduate and above	35	419.4734	3.17631	.53689	418.3823	420.5645	407.25	425.62
	Total	400	419.2900	2.85979	.14299	419.0089	419.5711	400.25	425.62
FixedCost	None or primary	174	941.2041	4.80852	.36453	940.4846	941.9236	930.25	954.11
	Secondary and high school	191	941.8821	5.17712	.37460	941.1432	942.6210	930.55	958.65
	Graduate and above	35	942.0291	5.01573	.84781	940.3062	943.7521	930.25	951.25
	Total	400	941.6000	5.00547	.25027	941.1080	942.0920	930.25	958.65
Landrental	None or primary	174	514.0233	38.63785	2.92913	508.2418	519.8047	8.66	523.11
	Secondary and high school	191	517.3991	2.76367	.19997	517.0047	517.7936	508.75	524.11
	Graduate and above	35	517.1629	3.26884	.55253	516.0400	518.2857	510.24	524.11

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
	Total	400	515.9100	25.58495	1.27925	513.3950	518.4249	8.66	524.11
Agriculturalequipmentdepreciation	None or primary	174	35.8481	3.06086	.23204	35.3901	36.3061	30.11	40.21
	Secondary and high school	191	37.6068	21.62465	1.56470	34.5204	40.6932	30.14	332.20
	Graduate and above	35	36.9011	2.65726	.44916	35.9883	37.8139	31.25	40.25
	Total	400	36.7800	15.10132	.75507	35.2956	38.2644	30.11	332.20
Investmentinterestinagriculturalequipment	None or primary	174	3.3257	.26496	.02009	3.2860	3.3653	3.00	3.96
	Secondary and high school	191	3.3118	.25452	.01842	3.2755	3.3482	3.00	3.97
	Graduate and above	35	3.3363	.39157	.06619	3.2018	3.4708	3.00	5.00
	Total	400	3.3200	.27280	.01364	3.2932	3.3468	3.00	5.00
AverageCostBeforeYield	None or primary	174	385.6875	4.03931	.30622	385.0831	386.2919	348.62	390.85
	Secondary and high school	191	385.4871	3.51170	.25410	384.9859	385.9884	357.26	392.78
	Graduate and above	35	385.6666	2.93869	.49673	384.6571	386.6760	380.14	390.54
	Total	400	385.5900	3.70032	.18502	385.2263	385.9537	348.62	392.78
Totalcost	None or primary	174	6951.5520	2.46916	.18719	6951.1825	6951.9215	6940.15	6961.22
	Secondary and high school	191	6951.5591	2.70191	.19550	6951.1735	6951.9447	6940.15	6961.25
	Graduate and above	35	6951.2637	2.28358	.38600	6950.4793	6952.0482	6947.85	6957.11
	Total	400	6951.5302	2.56339	.12817	6951.2782	6951.7821	6940.15	6961.25
Totalcostperkilogram	None or primary	174	2.1921	.23250	.01763	2.1573	2.2269	1.59	2.98
	Secondary and high school	191	2.1874	.22400	.01621	2.1555	2.2194	1.65	2.98
	Graduate and above	35	2.0791	.15960	.02698	2.0243	2.1340	1.56	2.35
	Total	400	2.1800	.22469	.01123	2.1579	2.2021	1.56	2.98
Availablecostperkg	None or primary	174	1.8586	.36835	.02792	1.8035	1.9137	1.00	2.65
	Secondary and high school	191	1.9066	.38347	.02775	1.8519	1.9614	1.01	2.98
	Graduate and above	35	1.9551	.34971	.05911	1.8350	2.0753	1.05	2.36
	Total	400	1.8900	.37444	.01872	1.8532	1.9268	1.00	2.98
AverageYield	None or primary	174	3191.1316	87.71073	6.64933	3178.0073	3204.2558	3155.00	3995.00
	Secondary and high school	191	3182.4375	12.87483	.93159	3180.6000	3184.2751	3133.20	3262.20
	Graduate and above	35	3179.9266	15.67508	2.64957	3174.5420	3185.3111	3154.00	3205.59
	Total	400	3185.9997	58.79032	2.93952	3180.2209	3191.7786	3133.20	3995.00
AveragePrice	None or primary	174	3.3894	.24407	.01850	3.3528	3.4259	3.00	3.96
	Secondary and high school	191	3.3891	.22876	.01655	3.3564	3.4217	3.00	3.97
	Graduate and above	35	3.3983	.22420	.03790	3.3213	3.4753	3.05	3.95
	Total	400	3.3900	.23460	.01173	3.3669	3.4131	3.00	3.97
Totalincome	None or primary	174	10792.7125	70.30254	5.32962	10782.1930	10803.2319	10601.33	10897.54
	Secondary and high school	191	10813.8610	533.92657	38.63357	10737.6552	10890.0669	10601.21	18065.33
	Graduate and above	35	10766.8043	73.19584	12.37235	10741.6606	10791.9479	10602.33	10895.36

Descriptives

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Total	400	10800.5440	372.23948	18.61197	10763.9542	10837.1337	10601.21	18065.33

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TotalFarmIncome	Between Groups	2.849E11	2	1.425E11	.981	.376
	Within Groups	5.764E13	397	1.452E11		
	Total	5.793E13	399			
TotalHouseholdIncome	Between Groups	1.244E11	2	6.219E10	.531	.588
	Within Groups	4.647E13	397	1.171E11		
	Total	4.659E13	399			
TotalProductionOfOilPalmTonPerYear	Between Groups	99526.460	2	49763.230	1.682	.187
	Within Groups	11745742.690	397	29586.254		
	Total	11845269.151	399			
Howlongforplantation	Between Groups	101.962	2	50.981	1.638	.196
	Within Groups	12358.216	397	31.129		
	Total	12460.177	399			
OilpalmIncome	Between Groups	2.232E10	2	1.116E10	.138	.871
	Within Groups	3.208E13	397	8.079E10		
	Total	3.210E13	399			
CostLabor	Between Groups	3642480.309	2	1821240.154	1.145	.319
	Within Groups	6.312E8	397	1589989.827		
	Total	6.349E8	399			
Maintenance	Between Groups	29.274	2	14.637	.034	.967
	Within Groups	172310.700	397	434.032		
	Total	172339.974	399			
Harvest	Between Groups	4047.349	2	2023.675	3.393	.035
	Within Groups	236801.341	397	596.477		
	Total	240848.690	399			
Input	Between Groups	2396.731	2	1198.366	3.569	.029
	Within Groups	133313.838	397	335.803		
	Total	135710.569	399			
Fertilizer	Between Groups	2175.258	2	1087.629	.885	.414
	Within Groups	487877.864	397	1228.911		
	Total	490053.123	399			
Pesticidesandweedprevention	Between Groups	91.292	2	45.646	.064	.938
	Within Groups	283413.334	397	713.887		
	Total	283504.626	399			
Fuelandlubrication	Between Groups	24.845	2	12.422	.833	.436
	Within Groups	5921.531	397	14.916		
	Total	5946.376	399			
Agriculturalmaterialsandsupplies	Between Groups	5.122	2	2.561	1.146	.319
	Within Groups	886.848	397	2.234		
	Total	891.970	399			
Agriculturalequipmentrepair	Between Groups	1.154	2	.577	2.626	.074
	Within Groups	87.243	397	.220		
	Total	88.397	399			
Investmentinterest	Between Groups	18.050	2	9.025	1.104	.333
	Within Groups	3245.139	397	8.174		
	Total	3263.189	399			
FixedCost	Between Groups	48.920	2	24.460	.976	.378
	Within Groups	9947.917	397	25.058		
	Total	9996.837	399			
Landrental	Between Groups	1097.863	2	548.932	.838	.433
	Within Groups	260083.330	397	655.122		

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
	Total	261181.193	399			
Agriculturalequipmentdepreciation	Between Groups	282.182	2	141.091	.617	.540
	Within Groups	90709.693	397	228.488		
	Total	90991.874	399			
Investmentinterestinagriculturalequipment	Between Groups	.028	2	.014	.185	.831
	Within Groups	29.666	397	.075		
	Total	29.694	399			
AverageCostBeforeYield	Between Groups	3.881	2	1.940	.141	.868
	Within Groups	5459.387	397	13.752		
	Total	5463.268	399			
Totalcost	Between Groups	2.728	2	1.364	.207	.813
	Within Groups	2619.098	397	6.597		
	Total	2621.826	399			
Totalcostperkilogram	Between Groups	.392	2	.196	3.941	.020
	Within Groups	19.752	397	.050		
	Total	20.144	399			
Availablecostperkg	Between Groups	.373	2	.186	1.332	.265
	Within Groups	55.570	397	.140		
	Total	55.943	399			
AverageYield	Between Groups	8296.945	2	4148.473	1.201	.302
	Within Groups	1370767.484	397	3452.815		
	Total	1379064.429	399			
AveragePrice	Between Groups	.003	2	.001	.024	.976
	Within Groups	21.957	397	.055		
	Total	21.960	399			
Totalincome	Between Groups	84387.461	2	42193.730	.303	.738
	Within Groups	55201943.045	397	139047.715		
	Total	55286330.506	399			

ANOVA and F-Test between Class of Area and Other Variables

Oneway

[DataSet1] C:\Users\AppleKK\Desktop\Thesis Oct 2019\DATAKanchalika PD.sav

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
TotalFarmIncome	Smallholder	326	273908.8769	324121.56817	17951.43337	238593.2002	309224.5536	45990.00	2540000.00
	Largeholder	74	421730.5642	554774.55973	64491.23260	293199.7230	550261.4054	72950.00	2516800.00
	Total	400	301255.8891	381029.52907	19051.47645	263802.0715	338709.7066	45990.00	2540000.00
TotalHouseholdIncome	Smallholder	326	299112.1790	357425.68220	19795.97765	260167.7486	338056.6094	21500.00	3200000.00
	Largeholder	74	273925.5811	262635.76537	30530.78757	213077.8092	334773.3530	26000.00	1400000.00
	Total	400	294452.6584	341724.15111	17086.20756	260862.4166	328042.9002	21500.00	3200000.00
TotalProductionOfOilPalmTonPerYear	Smallholder	326	47.3593	183.11894	10.14202	27.4070	67.3116	1.82	3320.00
	Largeholder	74	166.8618	34.30624	3.98802	158.9136	174.8099	17.16	231.20
	Total	400	69.4673	172.30029	8.61501	52.5308	86.4038	1.82	3320.00
Howlongforplantation	Smallholder	326	14.4663	5.71991	.31680	13.8430	15.0895	1.00	30.00
	Largeholder	74	15.0135	4.97802	.57868	13.8602	16.1668	1.00	25.00
	Total	400	14.5675	5.58825	.27941	14.0182	15.1168	1.00	30.00
OilpalmIncome	Smallholder	326	275187.3312	275877.19421	15279.42462	245128.2708	305246.3916	10000.00	2537595.00
	Largeholder	74	306209.8785	316320.13257	36771.46850	232924.4475	379495.3095	53050.00	2410000.00
	Total	400	280926.5025	283627.95052	14181.39753	253046.9060	308806.0989	10000.00	2537595.00
CostLabor	Smallholder	326	2078.7881	989.99876	54.83096	1970.9197	2186.6565	1250.40	19852.24
	Largeholder	74	2255.5570	2075.46732	241.26818	1774.7102	2736.4038	1500.00	19852.24
	Total	400	2111.4903	1261.40754	63.07038	1987.4985	2235.4821	1250.40	19852.24
Maintenance	Smallholder	326	842.7015	20.91291	1.15826	840.4229	844.9801	800.00	895.00
	Largeholder	74	840.1530	20.20767	2.34909	835.4712	844.8347	800.00	899.00
	Total	400	842.2300	20.78292	1.03915	840.1871	844.2729	800.00	899.00
Harvest	Smallholder	326	1269.2864	26.14613	1.44810	1266.4375	1272.1352	1225.00	1563.00
	Largeholder	74	1269.1443	15.99272	1.85912	1265.4391	1272.8495	1200.00	1299.25
	Total	400	1269.2601	24.56890	1.22844	1266.8451	1271.6751	1200.00	1563.00
Input	Smallholder	326	3479.6896	19.48883	1.07939	3477.5661	3481.8130	3411.00	3587.00
	Largeholder	74	3476.7739	12.69134	1.47534	3473.8336	3479.7143	3449.00	3495.85
	Total	400	3479.1502	18.44253	.92213	3477.3373	3480.9630	3411.00	3587.00
Fertilizer	Smallholder	326	2955.9848	37.57782	2.08124	2951.8903	2960.0792	2550.00	2999.00
	Largeholder	74	2963.5809	19.45951	2.26212	2959.0725	2968.0893	2914.00	2998.00
	Total	400	2957.3900	35.04573	1.75229	2953.9452	2960.8349	2550.00	2999.00
Pesticidesandweedprevention	Smallholder	326	359.1498	28.89668	1.60044	356.0013	362.2983	33.00	395.55
	Largeholder	74	364.3399	11.99263	1.39411	361.5614	367.1183	335.00	394.00
	Total	400	360.1100	26.65592	1.33280	357.4898	362.7301	33.00	395.55
Fuelandlubrication	Smallholder	326	84.0713	3.19450	.17693	83.7232	84.4194	34.53	89.65
	Largeholder	74	83.4157	5.97240	.69428	82.0320	84.7994	34.22	87.55
	Total	400	83.9500	3.86047	.19302	83.5705	84.3295	34.22	89.65
Agriculturalmaterialsandsupplies	Smallholder	326	69.4698	1.48844	.08244	69.3076	69.6320	63.55	75.55
	Largeholder	74	69.6331	1.52754	.17757	69.2792	69.9870	65.00	74.55
	Total	400	69.5000	1.49516	.07476	69.3530	69.6470	63.55	75.55
Agriculturalequipmentrepair	Smallholder	326	8.2131	.47163	.02612	8.1617	8.2645	6.10	9.22
	Largeholder	74	8.1424	.46528	.05409	8.0346	8.2502	6.45	8.95
	Total	400	8.2000	.47069	.02353	8.1537	8.2463	6.10	9.22
Investmentinterest	Smallholder	326	419.3386	2.82762	.15661	419.0305	419.6467	400.25	425.62
	Largeholder	74	419.0759	3.00802	.34968	418.3790	419.7728	403.22	425.22
	Total	400	419.2900	2.85979	.14299	419.0089	419.5711	400.25	425.62
FixedCost	Smallholder	326	941.6938	4.96289	.27487	941.1531	942.2346	930.25	958.65
	Largeholder	74	941.1868	5.20337	.60488	939.9812	942.3923	930.25	956.52
	Total	400	941.6000	5.00547	.25027	941.1080	942.0920	930.25	958.65
Landrental	Smallholder	326	517.2039	2.83820	.15719	516.8947	517.5132	508.75	524.11
	Largeholder	74	510.2095	59.17384	6.87882	496.5000	523.9189	8.66	523.08
	Total	400	515.9099	25.58495	1.27925	513.3950	518.4249	8.66	524.11
Agriculturalequipmentdepreciation	Smallholder	326	36.8619	16.66627	.92306	35.0459	38.6778	30.11	332.20
	Largeholder	74	36.4194	3.11120	.36167	35.6986	37.1402	30.21	40.66
	Total	400	36.7800	15.10132	.75507	35.2956	38.2644	30.11	332.20
Investmentinterestin	Smallholder	326	3.3183	.27804	.01540	3.2880	3.3486	3.00	5.00
	Largeholder	74	3.3273	.25006	.02907	3.2694	3.3852	3.00	3.96

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
agriculturalequipment	Total	400	3.3200	.27280	.01364	3.2932	3.3468	3.00	5.00
AverageCostBeforeYield	Smallholder	326	385.6437	3.52445	.19520	385.2596	386.0277	348.62	392.78
	Largeholder	74	385.3536	4.41220	.51291	384.3314	386.3759	357.26	390.75
	Total	400	385.5900	3.70032	.18502	385.2263	385.9537	348.62	392.78
Totalcost	Smallholder	326	6951.4741	2.60732	.14441	6951.1900	6951.7582	6940.15	6961.25
	Largeholder	74	6951.7772	2.36091	.27445	6951.2302	6952.3241	6947.85	6961.25
	Total	400	6951.5302	2.56339	.12817	6951.2782	6951.7821	6940.15	6961.25
Totalcostperkilogram	Smallholder	326	2.1808	.21791	.01207	2.1571	2.2045	1.56	2.98
	Largeholder	74	2.1765	.25401	.02953	2.1176	2.2353	1.59	2.98
	Total	400	2.1800	.22469	.01123	2.1579	2.2021	1.56	2.98
Availablecostperkg	Smallholder	326	1.8976	.37053	.02052	1.8572	1.9379	1.01	2.98
	Largeholder	74	1.8566	.39209	.04558	1.7658	1.9475	1.00	2.37
	Total	400	1.8900	.37444	.01872	1.8532	1.9268	1.00	2.98
AverageYield	Smallholder	326	3186.9861	64.80864	3.58942	3179.9247	3194.0476	3133.20	3995.00
	Largeholder	74	3181.6542	12.97939	1.50882	3178.6471	3184.6613	3155.00	3205.59
	Total	400	3185.9997	58.79032	2.93952	3180.2209	3191.7786	3133.20	3995.00
AveragePrice	Smallholder	326	3.3878	.23719	.01314	3.3620	3.4137	3.00	3.97
	Largeholder	74	3.3996	.22415	.02606	3.3477	3.4515	3.02	3.96
	Total	400	3.3900	.23460	.01173	3.3669	3.4131	3.00	3.97
Totalincome	Smallholder	326	10805.3105	410.73799	22.74867	10760.5573	10850.0637	10601.21	18065.33
	Largeholder	74	10779.5454	75.57468	8.78538	10762.0362	10797.0546	10601.47	10895.55
	Total	400	10800.5440	372.23948	18.61197	10763.9542	10837.1337	10601.21	18065.33

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
TotalFarmIncome	Between Groups	1.318E12	1	1.318E12	9.265	.002
	Within Groups	5.661E13	398	1.422E11		
	Total	5.793E13	399			
TotalHouseholdIncome	Between Groups	3.826E10	1	3.826E10	.327	.568
	Within Groups	4.656E13	398	1.170E11		
	Total	4.659E13	399			
TotalProductionOfOilPalmTonPerYear	Between Groups	861276.662	1	861276.662	31.208	.000
	Within Groups	10983992.489	398	27597.971		
	Total	11845269.151	399			
Howlongforplantation	Between Groups	18.062	1	18.062	.578	.448
	Within Groups	12442.115	398	31.262		
	Total	12460.178	399			
OilpalmIncome	Between Groups	5.804E10	1	5.804E10	.721	.396
	Within Groups	3.204E13	398	8.050E10		
	Total	3.210E13	399			
CostLabor	Between Groups	1884522.556	1	1884522.556	1.185	.277
	Within Groups	6.330E8	398	1590411.856		
	Total	6.349E8	399			
Maintenance	Between Groups	391.716	1	391.716	.907	.342
	Within Groups	171948.258	398	432.031		
	Total	172339.974	399			
Harvest	Between Groups	1.217	1	1.217	.002	.964
	Within Groups	240847.473	398	605.144		
	Total	240848.690	399			
Input	Between Groups	512.697	1	512.697	1.509	.220
	Within Groups	135197.873	398	339.693		
	Total	135710.569	399			
Fertilizer	Between Groups	3480.015	1	3480.015	2.847	.092
	Within Groups	486573.108	398	1222.545		
	Total	490053.123	399			
	Between Groups	1624.566	1	1624.566	2.294	.131

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Pesticidesandweedprevention	Within Groups	281880.060	398	708.241		
	Total	283504.626	399			
Fuelandlubrication	Between Groups	25.923	1	25.923	1.743	.188
	Within Groups	5920.453	398	14.876		
	Total	5946.376	399			
Agriculturalmaterialsandsupplies	Between Groups	1.609	1	1.609	.719	.397
	Within Groups	890.361	398	2.237		
	Total	891.970	399			
Agriculturalequipmentrepair	Between Groups	.301	1	.301	1.359	.244
	Within Groups	88.096	398	.221		
	Total	88.397	399			
Investmentinterest	Between Groups	4.161	1	4.161	.508	.476
	Within Groups	3259.027	398	8.189		
	Total	3263.189	399			
FixedCost	Between Groups	15.507	1	15.507	.618	.432
	Within Groups	9981.329	398	25.079		
	Total	9996.837	399			
Landrental	Between Groups	2950.520	1	2950.520	4.548	.034
	Within Groups	258230.673	398	648.821		
	Total	261181.193	399			
Agriculturalequipmentdepreciation	Between Groups	11.808	1	11.808	.052	.820
	Within Groups	90980.066	398	228.593		
	Total	90991.874	399			
Investmentinterestinagriculturalequipment	Between Groups	.005	1	.005	.065	.799
	Within Groups	29.689	398	.075		
	Total	29.694	399			
AverageCostBeforeYield	Between Groups	5.073	1	5.073	.370	.543
	Within Groups	5458.196	398	13.714		
	Total	5463.268	399			
Totalcost	Between Groups	5.539	1	5.539	.843	.359
	Within Groups	2616.287	398	6.574		
	Total	2621.826	399			
Totalcostperkilogram	Between Groups	.001	1	.001	.022	.882
	Within Groups	20.143	398	.051		
	Total	20.144	399			
Availablecostperkg	Between Groups	.101	1	.101	.721	.396
	Within Groups	55.842	398	.140		
	Total	55.943	399			
AverageYield	Between Groups	1714.592	1	1714.592	.495	.482
	Within Groups	1377349.837	398	3460.678		
	Total	1379064.429	399			
AveragePrice	Between Groups	.008	1	.008	.152	.697
	Within Groups	21.951	398	.055		
	Total	21.960	399			
Totalincome	Between Groups	40036.168	1	40036.168	.288	.592
	Within Groups	55246294.338	398	138809.785		
	Total	55286330.506	399			

MEANS TABLES

Report

	MPpro1	MPpro2	MPpro3	MPpro4	MPpro5	MPpro6	MPpro7	MPpro8
Mean	1.0525	4.3750	4.6050	4.7625	4.7400	2.9875	1.3675	1.1100
N	400	400	400	400	400	400	400	400
Std. Deviation	.22331	.78160	.58723	.51649	.53208	.38433	1.13387	.31328

MPpro1 MPpro2 MPpro3 MPpro4 MPpro5 MPpro6 MPpro7 MPpro8 * Gender

Report

Gender		MPpro1	MPpro2	MPpro3	MPpro4	MPpro5	MPpro6	MPpro7	MPpro8
Male	Mean	1.0559	4.3454	4.5724	4.7599	4.7434	2.9836	1.3586	1.1053
	N	304	304	304	304	304	304	304	304
	Std. Deviation	.23015	.79755	.59815	.51854	.51379	.35839	1.27157	.30740
Female	Mean	1.0417	4.4687	4.7083	4.7708	4.7292	3.0000	1.3958	1.1250
	N	96	96	96	96	96	96	96	96
	Std. Deviation	.20088	.72480	.54128	.51256	.58901	.45883	.49160	.33245
Total	Mean	1.0525	4.3750	4.6050	4.7625	4.7400	2.9875	1.3675	1.1100
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.22331	.78160	.58723	.51649	.53208	.38433	1.13387	.31328

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPpro1 * Gender	Between Groups	(Combined)	.015	1	.015	.297	.586
	Within Groups		19.883	398	.050		
	Total		19.898	399			
MPpro2 * Gender	Between Groups	(Combined)	1.110	1	1.110	1.821	.178
	Within Groups		242.640	398	.610		
	Total		243.750	399			
MPpro3 * Gender	Between Groups	(Combined)	1.349	1	1.349	3.940	.048
	Within Groups		136.241	398	.342		
	Total		137.590	399			
MPpro4 * Gender	Between Groups	(Combined)	.009	1	.009	.033	.856
	Within Groups		106.429	398	.267		
	Total		106.437	399			
MPpro5 * Gender	Between Groups	(Combined)	.015	1	.015	.052	.819
	Within Groups		112.945	398	.284		
	Total		112.960	399			
MPpro6 * Gender	Between Groups	(Combined)	.020	1	.020	.133	.715
	Within Groups		58.918	398	.148		
	Total		58.938	399			
MPpro7 * Gender	Between Groups	(Combined)	.101	1	.101	.079	.779
	Within Groups		512.876	398	1.289		
	Total		512.977	399			
MPpro8 * Gender	Between Groups	(Combined)	.028	1	.028	.289	.591
	Within Groups		39.132	398	.098		
	Total		39.160	399			

MPpro1 MPpro2 MPpro3 MPpro4 MPpro5 MPpro6 MPpro7 MPpro8 * ClassesAge

Report

ClassesAge		MPpro1	MPpro2	MPpro3	MPpro4	MPpro5	MPpro6	MPpro7	MPpro8
Young farmers	Mean	1.0567	4.4278	4.6082	4.7835	4.7268	2.9639	1.2990	1.0979
	N	194	194	194	194	194	194	194	194
	Std. Deviation	.23187	.77356	.56782	.46039	.55065	.38594	.45899	.29800
Old farmers	Mean	1.0485	4.3252	4.6019	4.7427	4.7524	3.0097	1.4320	1.1214
	N	206	206	206	206	206	206	206	206
	Std. Deviation	.21544	.78774	.60631	.56467	.51501	.38242	1.51504	.32734
Total	Mean	1.0525	4.3750	4.6050	4.7625	4.7400	2.9875	1.3675	1.1100
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.22331	.78160	.58723	.51649	.53208	.38433	1.13387	.31328

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPpro1 * ClassesAge	Between Groups	(Combined)	.007	1	.007	.133	.716
	Within Groups		19.891	398	.050		
	Total		19.898	399			
MPpro2 * ClassesAge	Between Groups	(Combined)	1.052	1	1.052	1.724	.190
	Within Groups		242.698	398	.610		
	Total		243.750	399			
MPpro3 * ClassesAge	Between Groups	(Combined)	.004	1	.004	.011	.915
	Within Groups		137.586	398	.346		
	Total		137.590	399			
MPpro4 * ClassesAge	Between Groups	(Combined)	.166	1	.166	.622	.431
	Within Groups		106.271	398	.267		
	Total		106.437	399			
MPpro5 * ClassesAge	Between Groups	(Combined)	.066	1	.066	.231	.631
	Within Groups		112.894	398	.284		
	Total		112.960	399			
MPpro6 * ClassesAge	Between Groups	(Combined)	.209	1	.209	1.420	.234
	Within Groups		58.728	398	.148		
	Total		58.937	399			
MPpro7 * ClassesAge	Between Groups	(Combined)	1.769	1	1.769	1.377	.241
	Within Groups		511.208	398	1.284		
	Total		512.978	399			
MPpro8 * ClassesAge	Between Groups	(Combined)	.055	1	.055	.558	.456
	Within Groups		39.105	398	.098		
	Total		39.160	399			

MPpro1 MPpro2 MPpro3 MPpro4 MPpro5 MPpro6 MPpro7 MPpro8 * ClassesEducation

Report

ClassesEducation		MPpro1	MPpro2	MPpro3	MPpro4	MPpro5	MPpro6	MPpro7	MPpro8
None or primary	Mean	1.0460	4.3391	4.6494	4.7586	4.7586	2.9425	1.3276	1.1264
	N	174	174	174	174	174	174	174	174
	Std. Deviation	.21004	.81530	.54622	.54752	.51488	.35192	.47069	.33330
Secondary and high school	Mean	1.0576	4.3979	4.5602	4.7592	4.7120	3.0262	1.4346	1.0995
	N	191	191	191	191	191	191	191	191
	Std. Deviation	.23358	.74607	.62009	.50743	.55801	.38980	1.56765	.30009
Graduate and above	Mean	1.0571	4.4286	4.6286	4.8000	4.8000	3.0000	1.2000	1.0857
	N	35	35	35	35	35	35	35	35
	Std. Deviation	.23550	.81478	.59832	.40584	.47279	.48507	.40584	.28403
Total	Mean	1.0525	4.3750	4.6050	4.7625	4.7400	2.9875	1.3675	1.1100
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.22331	.78160	.58723	.51649	.53208	.38433	1.13387	.31328

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPpro1 * ClassesEducation	Between Groups	(Combined)	.013	2	.007	.131	.877
	Within Groups		19.884	397	.050		
	Total		19.898	399			
MPpro2 * ClassesEducation	Between Groups	(Combined)	.425	2	.213	.347	.707
	Within Groups		243.325	397	.613		
	Total		243.750	399			
MPpro3 * ClassesEducation	Between Groups	(Combined)	.746	2	.373	1.082	.340
	Within Groups		136.844	397	.345		
	Total		137.590	399			
MPpro4 * ClassesEducation	Between Groups	(Combined)	.054	2	.027	.101	.904
	Within Groups		106.384	397	.268		
	Total		106.437	399			
MPpro5 * ClassesEducation	Between Groups	(Combined)	.336	2	.168	.592	.554
	Within Groups		112.624	397	.284		
	Total		112.960	399			
MPpro6 * ClassesEducation	Between Groups	(Combined)	.643	2	.322	2.190	.113
	Within Groups		58.294	397	.147		
	Total		58.938	399			
MPpro7 * ClassesEducation	Between Groups	(Combined)	2.118	2	1.059	.823	.440
	Within Groups		510.860	397	1.287		
	Total		512.977	399			
MPpro8 * ClassesEducation	Between Groups	(Combined)	.089	2	.044	.451	.637
	Within Groups		39.071	397	.098		
	Total		39.160	399			

MPpro1 MPpro2 MPpro3 MPpro4 MPpro5 MPpro6 MPpro7 MPpro8 * ClassesTotalArea

Report

ClassesTotalArea		MPpro1	MPpro2	MPpro3	MPpro4	MPpro5	MPpro6	MPpro7	MPpro8
Smallholder	Mean	1.0583	4.3620	4.6166	4.7638	4.7423	2.9969	1.3681	1.1104
	N	326	326	326	326	326	326	326	326
	Std. Deviation	.23464	.79477	.58460	.51683	.53882	.38828	1.23516	.31391
Largeholder	Mean	1.0270	4.4324	4.5541	4.7568	4.7297	2.9459	1.3649	1.1081
	N	74	74	74	74	74	74	74	74
	Std. Deviation	.16327	.72303	.60004	.51845	.50470	.36609	.48468	.31264
Total	Mean	1.0525	4.3750	4.6050	4.7625	4.7400	2.9875	1.3675	1.1100
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.22331	.78160	.58723	.51649	.53208	.38433	1.13387	.31328

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPpro1 * ClassesTotalArea	Between Groups	(Combined)	.059	1	.059	1.182	.278
	Within Groups		19.839	398	.050		
	Total		19.897	399			
MPpro2 * ClassesTotalArea	Between Groups	(Combined)	.299	1	.299	.490	.485
	Within Groups		243.451	398	.612		
	Total		243.750	399			
MPpro3 * ClassesTotalArea	Between Groups	(Combined)	.236	1	.236	.683	.409
	Within Groups		137.354	398	.345		
	Total		137.590	399			
MPpro4 * ClassesTotalArea	Between Groups	(Combined)	.003	1	.003	.011	.916
	Within Groups		106.435	398	.267		
	Total		106.438	399			
MPpro5 * ClassesTotalArea	Between Groups	(Combined)	.010	1	.010	.034	.854
	Within Groups		112.950	398	.284		
	Total		112.960	399			
MPpro6 * ClassesTotalArea	Between Groups	(Combined)	.157	1	.157	1.062	.303
	Within Groups		58.781	398	.148		
	Total		58.937	399			
MPpro7 * ClassesTotalArea	Between Groups	(Combined)	.001	1	.001	.000	.982
	Within Groups		512.977	398	1.289		
	Total		512.978	399			
MPpro8 * ClassesTotalArea	Between Groups	(Combined)	.000	1	.000	.003	.954
	Within Groups		39.160	398	.098		
	Total		39.160	399			

Report

	MPeco1	MPeco2	MPeco3	MPeco4	MPeco5	MPeco6	MPeco7	MPeco8	MPeco9	MPeco10	MPeco11	MPeco12
Mean	4.5325	4.7900	4.6150	4.6225	4.6650	4.9675	4.1625	4.6225	1.2975	4.1900	2.7850	1.4875
N	400	400	400	400	400	400	400	400	400	400	400	400
Std. Deviation	.59987	.40782	.48720	.48537	.47258	.17755	.99678	.48537	.48433	.83705	.41134	.50047

MPeco1 MPeco2 MPeco3 MPeco4 MPeco5 MPeco6 MPeco7 MPeco8 MPeco9 MPeco10 MPeco11 MPeco12 * Gender

Report

Gender		MPeco1	MPeco2	MPeco3	MPeco4	MPeco5	MPeco6	MPeco7	MPeco8	MPeco9	MPeco10	MPeco11	MPeco12
Male	Mean	4.5197	4.7697	4.6086	4.6184	4.6382	4.9638	4.1283	4.6184	1.3026	4.1645	2.8026	1.4770
	N	304	304	304	304	304	304	304	304	304	304	304	304
	Std. Deviation	.60220	.42170	.48888	.48658	.48133	.18706	1.00493	.48658	.47428	.83206	.39867	.50029
Female	Mean	4.5729	4.8542	4.6354	4.6354	4.7500	4.9792	4.2708	4.6354	1.2813	4.2708	2.7292	1.5208
	N	96	96	96	96	96	96	96	96	96	96	96	96
	Std. Deviation	.59374	.35479	.48384	.48384	.43529	.14358	.96768	.48384	.51714	.85198	.44672	.50219
Total	Mean	4.5325	4.7900	4.6150	4.6225	4.6650	4.9675	4.1625	4.6225	1.2975	4.1900	2.7850	1.4875
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Std. Deviation	.59987	.40782	.48720	.48537	.47258	.17755	.99678	.48537	.48433	.83705	.41134	.50047

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPeco1 * Gender	Between Groups	(Combined)	.206	1	.206	.573	.450
	Within Groups		143.371	398	.360		
	Total		143.578	399			
MPeco2 * Gender	Between Groups	(Combined)	.520	1	.520	3.144	.077
	Within Groups		65.840	398	.165		
	Total		66.360	399			
MPeco3 * Gender	Between Groups	(Combined)	.053	1	.053	.221	.638
	Within Groups		94.657	398	.238		
	Total		94.710	399			
MPeco4 * Gender	Between Groups	(Combined)	.021	1	.021	.089	.765
	Within Groups		93.976	398	.236		
	Total		93.998	399			
MPeco5 * Gender	Between Groups	(Combined)	.913	1	.913	4.118	.043
	Within Groups		88.197	398	.222		
	Total		89.110	399			
MPeco6 * Gender	Between Groups	(Combined)	.017	1	.017	.545	.461
	Within Groups		12.560	398	.032		
	Total		12.578	399			
MPeco7 * Gender	Between Groups	(Combined)	1.482	1	1.482	1.494	.222
	Within Groups		394.955	398	.992		
	Total		396.438	399			
MPeco8 * Gender	Between Groups	(Combined)	.021	1	.021	.089	.765
	Within Groups		93.976	398	.236		
	Total		93.998	399			
MPeco9 * Gender	Between Groups	(Combined)	.033	1	.033	.142	.707
	Within Groups		93.564	398	.235		
	Total		93.598	399			
MPeco10 * Gender	Between Groups	(Combined)	.825	1	.825	1.179	.278

	Within Groups		278.735	398	.700		
	Total		279.560	399			
MPeco11 * Gender	Between Groups	(Combined)	.394	1	.394	2.335	.127
	Within Groups		67.116	398	.169		
	Total		67.510	399			
MPeco12 * Gender	Between Groups	(Combined)	.140	1	.140	.560	.455
	Within Groups		99.797	398	.251		
	Total		99.938	399			

MPeco1 MPeco2 MPeco3 MPeco4 MPeco5 MPeco6 MPeco7 MPeco8 MPeco9 MPeco10 MPeco11 MPeco12 * ClassesAge

Report

ClassesAge		MPeco1	MPeco2	MPeco3	MPeco4	MPeco5	MPeco6	MPeco7	MPeco8	MPeco9	MPeco10	MPeco11	MPeco12
Young farmers	Mean	4.5515	4.7577	4.6495	4.6598	4.6546	4.9845	4.1495	4.6598	1.2629	4.1495	2.7990	1.5206
	N	194	194	194	194	194	194	194	194	194	194	194	194
	Std. Deviation	.59351	.42956	.47837	.47500	.47672	.12371	.99393	.47500	.46423	.83531	.40181	.50087
Old farmers	Mean	4.5146	4.8204	4.5825	4.5874	4.6748	4.9515	4.1748	4.5874	1.3301	4.2282	2.7718	1.4563
	N	206	206	206	206	206	206	206	206	206	206	206	206
	Std. Deviation	.60670	.38480	.49434	.49351	.46961	.21544	1.00173	.49351	.50148	.83892	.42067	.49930
Total	Mean	4.5325	4.7900	4.6150	4.6225	4.6650	4.9675	4.1625	4.6225	1.2975	4.1900	2.7850	1.4875
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Std. Deviation	.59987	.40782	.48720	.48537	.47258	.17755	.99678	.48537	.48433	.83705	.41134	.50047

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPeco1 * ClassesAge	Between Groups	(Combined)	.137	1	.137	.379	.538
	Within Groups		143.441	398	.360		
	Total		143.578	399			
MPeco2 * ClassesAge	Between Groups	(Combined)	.392	1	.392	2.366	.125
	Within Groups		65.968	398	.166		
	Total		66.360	399			
MPeco3 * ClassesAge	Between Groups	(Combined)	.448	1	.448	1.891	.170
	Within Groups		94.262	398	.237		
	Total		94.710	399			
MPeco4 * ClassesAge	Between Groups	(Combined)	.524	1	.524	2.231	.136
	Within Groups		93.474	398	.235		
	Total		93.998	399			
MPeco5 * ClassesAge	Between Groups	(Combined)	.040	1	.040	.181	.671
	Within Groups		89.070	398	.224		
	Total		89.110	399			
MPeco6 * ClassesAge	Between Groups	(Combined)	.109	1	.109	3.490	.062
	Within Groups		12.468	398	.031		
	Total		12.578	399			
MPeco7 * ClassesAge	Between Groups	(Combined)	.064	1	.064	.064	.800
	Within Groups		396.374	398	.996		
	Total		396.438	399			
MPeco8 * ClassesAge	Between Groups	(Combined)	.524	1	.524	2.231	.136
	Within Groups		93.474	398	.235		
	Total		93.998	399			
MPeco9 * ClassesAge	Between Groups	(Combined)	.451	1	.451	1.928	.166
	Within Groups		93.146	398	.234		
	Total		93.598	399			

MPeco10 * ClassesAge	Between Groups	(Combined)	.618	1	.618	.882	.348
	Within Groups		278.942	398	.701		
	Total		279.560	399			
MPeco11 * ClassesAge	Between Groups	(Combined)	.074	1	.074	.434	.510
	Within Groups		67.436	398	.169		
	Total		67.510	399			
MPeco12 * ClassesAge	Between Groups	(Combined)	.413	1	.413	1.652	.199
	Within Groups		99.524	398	.250		
	Total		99.938	399			

MPeco1 MPeco2 MPeco3 MPeco4 MPeco5 MPeco6 MPeco7 MPeco8 MPeco9 MPeco10 MPeco11 MPeco12 * ClassesEducation

Report

ClassesEducation		MPeco1	MPeco2	MPeco3	MPeco4	MPeco5	MPeco6	MPeco7	MPeco8	MPeco9	MPeco10	MPeco11	MPeco12
None or primary	Mean	4.6494	4.7759	4.6264	4.6322	4.6782	4.9598	4.1552	4.6322	1.2989	4.2011	2.7989	1.4828
	N	174	174	174	174	174	174	174	174	174	174	174	174
	Std. Deviation	.54622	.41822	.48515	.48360	.46853	.19707	.98195	.48360	.49541	.81162	.40202	.50114
Secondary and high school	Mean	4.4031	4.8010	4.6126	4.6178	4.6387	4.9686	4.1466	4.6178	1.3089	4.1937	2.7644	1.5079
	N	191	191	191	191	191	191	191	191	191	191	191	191
	Std. Deviation	.63228	.40026	.48844	.48720	.48163	.17489	1.01540	.48720	.48545	.84552	.42549	.50125
Graduate and above	Mean	4.6571	4.8000	4.5714	4.6000	4.7429	5.0000	4.2857	4.6000	1.2286	4.1143	2.8286	1.4000
	N	35	35	35	35	35	35	35	35	35	35	35	35
	Std. Deviation	.53922	.40584	.50210	.49705	.44344	.00000	.98731	.49705	.42604	.93215	.38239	.49705
Total	Mean	4.5325	4.7900	4.6150	4.6225	4.6650	4.9675	4.1625	4.6225	1.2975	4.1900	2.7850	1.4875
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Std. Deviation	.59987	.40782	.48720	.48537	.47258	.17755	.99678	.48537	.48433	.83705	.41134	.50047

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPeco1 * ClassesEducation	Between Groups	(Combined)	6.119	2	3.059	8.836	.000
	Within Groups		137.459	397	.346		
	Total		143.577	399			
MPeco2 * ClassesEducation	Between Groups	(Combined)	.062	2	.031	.184	.832
	Within Groups		66.298	397	.167		
	Total		66.360	399			
MPeco3 * ClassesEducation	Between Groups	(Combined)	.090	2	.045	.190	.827
	Within Groups		94.620	397	.238		
	Total		94.710	399			
MPeco4 * ClassesEducation	Between Groups	(Combined)	.038	2	.019	.081	.922
	Within Groups		93.959	397	.237		
	Total		93.997	399			
MPeco5 * ClassesEducation	Between Groups	(Combined)	.374	2	.187	.837	.434
	Within Groups		88.736	397	.224		
	Total		89.110	399			
MPeco6 * ClassesEducation	Between Groups	(Combined)	.048	2	.024	.754	.471
	Within Groups		12.530	397	.032		
	Total		12.578	399			
MPeco7 * ClassesEducation	Between Groups	(Combined)	.589	2	.295	.295	.744
	Within Groups		395.848	397	.997		
	Total		396.438	399			
MPeco8 * ClassesEducation	Between Groups	(Combined)	.038	2	.019	.081	.922
	Within Groups		93.959	397	.237		
	Total		93.997	399			
MPeco9 * ClassesEducation	Between Groups	(Combined)	.191	2	.096	.407	.666
	Within Groups		93.406	397	.235		
	Total		93.597	399			

MPeco10 * ClassesEducation	Between Groups	(Combined)	.225	2	.112	.160	.852
	Within Groups		279.335	397	.704		
	Total		279.560	399			
MPeco11 * ClassesEducation	Between Groups	(Combined)	.181	2	.090	.533	.587
	Within Groups		67.329	397	.170		
	Total		67.510	399			
MPeco12 * ClassesEducation	Between Groups	(Combined)	.351	2	.176	.700	.497
	Within Groups		99.586	397	.251		
	Total		99.937	399			

MPeco1 MPeco2 MPeco3 MPeco4 MPeco5 MPeco6 MPeco7 MPeco8 MPeco9 MPeco10 MPeco11 MPeco12 * ClassesTotalArea

Report

ClassesTotalArea		MPeco1	MPeco2	MPeco3	MPeco4	MPeco5	MPeco6	MPeco7	MPeco8	MPeco9	MPeco10	MPeco11	MPeco12
Smallholder	Mean	4.5092	4.7822	4.6288	4.6319	4.6503	4.9785	4.1626	4.6319	1.3190	4.1748	2.7761	1.4785
	N	326	326	326	326	326	326	326	326	326	326	326	326
	Std. Deviation	.60121	.41338	.48386	.48303	.47761	.14518	1.00213	.48303	.49868	.83580	.41751	.50031
Largeholder	Mean	4.6351	4.8243	4.5541	4.5811	4.7297	4.9189	4.1622	4.5811	1.2027	4.2568	2.8243	1.5270
	N	74	74	74	74	74	74	74	74	74	74	74	74
	Std. Deviation	.58694	.38314	.50046	.49675	.44713	.27482	.97961	.49675	.40476	.84498	.38314	.50268
Total	Mean	4.5325	4.7900	4.6150	4.6225	4.6650	4.9675	4.1625	4.6225	1.2975	4.1900	2.7850	1.4875
	N	400	400	400	400	400	400	400	400	400	400	400	400
	Std. Deviation	.59987	.40782	.48720	.48537	.47258	.17755	.99678	.48537	.48433	.83705	.41134	.50047

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPeco1 * ClassesTotalArea	Between Groups	(Combined)	.956	1	.956	2.669	.103
	Within Groups		142.621	398	.358		
	Total		143.578	399			
MPeco2 * ClassesTotalArea	Between Groups	(Combined)	.107	1	.107	.643	.423
	Within Groups		66.253	398	.166		
	Total		66.360	399			
MPeco3 * ClassesTotalArea	Between Groups	(Combined)	.337	1	.337	1.422	.234
	Within Groups		94.373	398	.237		
	Total		94.710	399			
MPeco4 * ClassesTotalArea	Between Groups	(Combined)	.156	1	.156	.661	.417
	Within Groups		93.842	398	.236		
	Total		93.997	399			
MPeco5 * ClassesTotalArea	Between Groups	(Combined)	.380	1	.380	1.706	.192
	Within Groups		88.730	398	.223		
	Total		89.110	399			
MPeco6 * ClassesTotalArea	Between Groups	(Combined)	.214	1	.214	6.899	.009
	Within Groups		12.363	398	.031		
	Total		12.577	399			
MPeco7 * ClassesTotalArea	Between Groups	(Combined)	.000	1	.000	.000	.997
	Within Groups		396.437	398	.996		
	Total		396.438	399			
MPeco8 * ClassesTotalArea	Between Groups	(Combined)	.156	1	.156	.661	.417
	Within Groups		93.842	398	.236		
	Total		93.997	399			
MPeco9 * ClassesTotalArea	Between Groups	(Combined)	.816	1	.816	3.500	.062
	Within Groups		92.782	398	.233		
	Total		93.597	399			

MPeco10 * ClassesTotalArea	Between Groups	(Combined)	.405	1	.405	.577	.448
	Within Groups		279.155	398	.701		
	Total		279.560	399			
MPeco11 * ClassesTotalArea	Between Groups	(Combined)	.140	1	.140	.829	.363
	Within Groups		67.370	398	.169		
	Total		67.510	399			
MPeco12 * ClassesTotalArea	Between Groups	(Combined)	.142	1	.142	.566	.452
	Within Groups		99.796	398	.251		
	Total		99.937	399			

Report

	MPsoc1	MPsoc2	MPsoc3	MPsoc4	MPsoc5	MPsoc6	MPsoc7	MPsoc8
Mean	3.1550	4.2025	1.2675	1.1150	4.0025	4.6975	3.2600	4.4725
N	400	400	400	400	400	400	400	400
Std. Deviation	.93711	.74018	.44321	.31942	1.12278	.45992	1.20666	.70391

MPsoc1 MPsoc2 MPsoc3 MPsoc4 MPsoc5 MPsoc6 MPsoc7 MPsoc8 * Gender

Report

Gender		MPsoc1	MPsoc2	MPsoc3	MPsoc4	MPsoc5	MPsoc6	MPsoc7	MPsoc8
Male	Mean	3.1546	4.1974	1.2697	1.1118	4.0197	4.6776	3.2730	4.4243
	N	304	304	304	304	304	304	304	304
	Std. Deviation	.95740	.73156	.44455	.31569	1.11675	.46815	1.18620	.71813
Female	Mean	3.1562	4.2188	1.2604	1.1250	3.9479	4.7604	3.2188	4.6250
	N	96	96	96	96	96	96	96	96
	Std. Deviation	.87453	.77055	.44117	.33245	1.14588	.42907	1.27488	.63660
Total	Mean	3.1550	4.2025	1.2675	1.1150	4.0025	4.6975	3.2600	4.4725
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.93711	.74018	.44321	.31942	1.12278	.45992	1.20666	.70391

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPsoc1 * Gender	Between Groups	(Combined)	.000	1	.000	.000	.988
	Within Groups		350.390	398	.880		
	Total		350.390	399			
MPsoc2 * Gender	Between Groups	(Combined)	.033	1	.033	.061	.805
	Within Groups		218.564	398	.549		
	Total		218.597	399			
MPsoc3 * Gender	Between Groups	(Combined)	.006	1	.006	.032	.858
	Within Groups		78.371	398	.197		
	Total		78.378	399			
MPsoc4 * Gender	Between Groups	(Combined)	.013	1	.013	.124	.725
	Within Groups		40.697	398	.102		
	Total		40.710	399			
MPsoc5 * Gender	Between Groups	(Combined)	.376	1	.376	.298	.585
	Within Groups		502.621	398	1.263		
	Total		502.998	399			
MPsoc6 * Gender	Between Groups	(Combined)	.500	1	.500	2.372	.124
	Within Groups		83.897	398	.211		
	Total		84.397	399			
MPsoc7 * Gender	Between Groups	(Combined)	.215	1	.215	.147	.701
	Within Groups		580.745	398	1.459		
	Total		580.960	399			
MPsoc8 * Gender	Between Groups	(Combined)	2.938	1	2.938	6.003	.015
	Within Groups		194.760	398	.489		
	Total		197.697	399			

MPsoc1 MPsoc2 MPsoc3 MPsoc4 MPsoc5 MPsoc6 MPsoc7 MPsoc8 * ClassesAge

Report

ClassesAge		MPsoc1	MPsoc2	MPsoc3	MPsoc4	MPsoc5	MPsoc6	MPsoc7	MPsoc8
Young farmers	Mean	3.1856	4.1907	1.3144	1.0979	3.8814	4.6907	3.2680	4.4278
	N	194	194	194	194	194	194	194	194
	Std. Deviation	.94216	.74786	.46549	.29800	1.15232	.46339	1.20462	.73227
Old farmers	Mean	3.1262	4.2136	1.2233	1.1311	4.1165	4.7039	3.2524	4.5146
	N	206	206	206	206	206	206	206	206
	Std. Deviation	.93370	.73452	.41747	.33830	1.08471	.45766	1.21148	.67519
Total	Mean	3.1550	4.2025	1.2675	1.1150	4.0025	4.6975	3.2600	4.4725
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.93711	.74018	.44321	.31942	1.12278	.45992	1.20666	.70391

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPsoc1 * ClassesAge	Between Groups	(Combined)	.352	1	.352	.400	.527
	Within Groups		350.038	398	.879		
	Total		350.390	399			
MPsoc2 * ClassesAge	Between Groups	(Combined)	.052	1	.052	.095	.758
	Within Groups		218.545	398	.549		
	Total		218.598	399			
MPsoc3 * ClassesAge	Between Groups	(Combined)	.830	1	.830	4.259	.040
	Within Groups		77.548	398	.195		
	Total		78.378	399			
MPsoc4 * ClassesAge	Between Groups	(Combined)	.110	1	.110	1.075	.300
	Within Groups		40.600	398	.102		
	Total		40.710	399			
MPsoc5 * ClassesAge	Between Groups	(Combined)	5.520	1	5.520	4.417	.036
	Within Groups		497.477	398	1.250		
	Total		502.997	399			
MPsoc6 * ClassesAge	Between Groups	(Combined)	.017	1	.017	.082	.775
	Within Groups		84.380	398	.212		
	Total		84.397	399			
MPsoc7 * ClassesAge	Between Groups	(Combined)	.024	1	.024	.017	.897
	Within Groups		580.936	398	1.460		
	Total		580.960	399			
MPsoc8 * ClassesAge	Between Groups	(Combined)	.751	1	.751	1.519	.219
	Within Groups		196.946	398	.495		
	Total		197.698	399			

MPsoc1 MPsoc2 MPsoc3 MPsoc4 MPsoc5 MPsoc6 MPsoc7 MPsoc8 * ClassesEducation

Report

ClassesEducation		MPsoc1	MPsoc2	MPsoc3	MPsoc4	MPsoc5	MPsoc6	MPsoc7	MPsoc8
None or primary	Mean	3.0747	4.2414	1.2816	1.1034	3.9770	4.7184	3.3506	4.4770
	N	174	174	174	174	174	174	174	174
	Std. Deviation	.91875	.70449	.45108	.30542	1.14778	.45108	1.23909	.68598
Secondary and high school	Mean	3.2094	4.1728	1.2618	1.0995	3.9319	4.6597	3.2042	4.4346
	N	191	191	191	191	191	191	191	191
	Std. Deviation	.92799	.77221	.44076	.30009	1.11477	.47506	1.18995	.72885
Graduate and above	Mean	3.2571	4.1714	1.2286	1.2571	4.5143	4.8000	3.1143	4.6571
	N	35	35	35	35	35	35	35	35
	Std. Deviation	1.06668	.74698	.42604	.44344	.91944	.40584	1.13167	.63906
Total	Mean	3.1550	4.2025	1.2675	1.1150	4.0025	4.6975	3.2600	4.4725
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.93711	.74018	.44321	.31942	1.12278	.45992	1.20666	.70391

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPsoc1 * ClassesEducation	Between Groups	(Combined)	2.053	2	1.026	1.170	.312
	Within Groups		348.337	397	.877		
	Total		350.390	399			
MPsoc2 * ClassesEducation	Between Groups	(Combined)	.466	2	.233	.424	.655
	Within Groups		218.132	397	.549		
	Total		218.598	399			
MPsoc3 * ClassesEducation	Between Groups	(Combined)	.094	2	.047	.238	.788
	Within Groups		78.284	397	.197		
	Total		78.377	399			
MPsoc4 * ClassesEducation	Between Groups	(Combined)	.776	2	.388	3.859	.022
	Within Groups		39.934	397	.101		
	Total		40.710	399			
MPsoc5 * ClassesEducation	Between Groups	(Combined)	10.231	2	5.116	4.122	.017
	Within Groups		492.766	397	1.241		
	Total		502.997	399			
MPsoc6 * ClassesEducation	Between Groups	(Combined)	.717	2	.358	1.700	.184
	Within Groups		83.681	397	.211		
	Total		84.397	399			
MPsoc7 * ClassesEducation	Between Groups	(Combined)	2.766	2	1.383	.949	.388
	Within Groups		578.194	397	1.456		
	Total		580.960	399			
MPsoc8 * ClassesEducation	Between Groups	(Combined)	1.472	2	.736	1.489	.227
	Within Groups		196.226	397	.494		
	Total		197.697	399			

MPsoc1 MPsoc2 MPsoc3 MPsoc4 MPsoc5 MPsoc6 MPsoc7 MPsoc8 * ClassesTotalArea

Report

ClassesTotalArea		MPsoc1	MPsoc2	MPsoc3	MPsoc4	MPsoc5	MPsoc6	MPsoc7	MPsoc8
Smallholder	Mean	3.1718	4.1963	1.2853	1.1227	3.9816	4.7025	3.2454	4.4755
	N	326	326	326	326	326	326	326	326
	Std. Deviation	.94198	.73471	.45224	.32860	1.13394	.45788	1.20303	.69571
Largeholder	Mean	3.0811	4.2297	1.1892	1.0811	4.0946	4.6757	3.3243	4.4595
	N	74	74	74	74	74	74	74	74
	Std. Deviation	.91796	.76833	.39433	.27482	1.07485	.47132	1.22874	.74373
Total	Mean	3.1550	4.2025	1.2675	1.1150	4.0025	4.6975	3.2600	4.4725
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.93711	.74018	.44321	.31942	1.12278	.45992	1.20666	.70391

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPsoc1 * ClassesTotalArea	Between Groups	(Combined)	.496	1	.496	.564	.453
	Within Groups		349.894	398	.879		
	Total		350.390	399			
MPsoc2 * ClassesTotalArea	Between Groups	(Combined)	.067	1	.067	.123	.726
	Within Groups		218.530	398	.549		
	Total		218.598	399			
MPsoc3 * ClassesTotalArea	Between Groups	(Combined)	.557	1	.557	2.848	.092
	Within Groups		77.821	398	.196		
	Total		78.378	399			
MPsoc4 * ClassesTotalArea	Between Groups	(Combined)	.104	1	.104	1.024	.312
	Within Groups		40.606	398	.102		
	Total		40.710	399			
MPsoc5 * ClassesTotalArea	Between Groups	(Combined)	.770	1	.770	.610	.435
	Within Groups		502.227	398	1.262		
	Total		502.997	399			
MPsoc6 * ClassesTotalArea	Between Groups	(Combined)	.043	1	.043	.204	.652
	Within Groups		84.354	398	.212		
	Total		84.397	399			
MPsoc7 * ClassesTotalArea	Between Groups	(Combined)	.376	1	.376	.258	.612
	Within Groups		580.584	398	1.459		
	Total		580.960	399			
MPsoc8 * ClassesTotalArea	Between Groups	(Combined)	.015	1	.015	.031	.860
	Within Groups		197.682	398	.497		
	Total		197.698	399			

Report

	MPenvi1	MPenvi2	MPenvi3	MPenvi4	MPenvi5	MPenvi6	MPenvi7	MPenvi8
Mean	4.3300	3.1625	1.4975	1.0000	4.7525	4.6000	4.6850	1.7650
N	400	400	400	400	400	400	400	400
Std. Deviation	.59749	.99427	.66037	.00000	.53569	.49051	.46510	.42453

MPenvi1 MPenvi2 MPenvi3 MPenvi4 MPenvi5 MPenvi6 MPenvi7 MPenvi8 * Gender

Report

Gender		MPenvi1	MPenvi2	MPenvi3	MPenvi4	MPenvi5	MPenvi6	MPenvi7	MPenvi8
Male	Mean	4.3158	3.2336	1.5099	1.0000	4.7533	4.5921	4.6678	1.7664
	N	304	304	304	304	304	304	304	304
	Std. Deviation	.60166	.98908	.68451	.00000	.52179	.49225	.47179	.42379
Female	Mean	4.3750	2.9375	1.4583	1.0000	4.7500	4.6250	4.7396	1.7604
	N	96	96	96	96	96	96	96	96
	Std. Deviation	.58490	.98208	.57887	.00000	.58038	.48666	.44117	.42907
Total	Mean	4.3300	3.1625	1.4975	1.0000	4.7525	4.6000	4.6850	1.7650
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.59749	.99427	.66037	.00000	.53569	.49051	.46510	.42453

ANOVA Table[a]

			Sum of Squares	df	Mean Square	F	Sig.
MPenvi1 * Gender	Between Groups	(Combined)	.256	1	.256	.716	.398
	Within Groups		142.184	398	.357		
	Total		142.440	399			
MPenvi2 * Gender	Between Groups	(Combined)	6.395	1	6.395	6.559	.011
	Within Groups		388.043	398	.975		
	Total		394.437	399			
MPenvi3 * Gender	Between Groups	(Combined)	.194	1	.194	.444	.506
	Within Groups		173.804	398	.437		
	Total		173.997	399			
MPenvi5 * Gender	Between Groups	(Combined)	.001	1	.001	.003	.958
	Within Groups		114.497	398	.288		
	Total		114.497	399			
MPenvi6 * Gender	Between Groups	(Combined)	.079	1	.079	.328	.567
	Within Groups		95.921	398	.241		
	Total		96.000	399			
MPenvi7 * Gender	Between Groups	(Combined)	.376	1	.376	1.743	.188
	Within Groups		85.934	398	.216		
	Total		86.310	399			
MPenvi8 * Gender	Between Groups	(Combined)	.003	1	.003	.015	.904
	Within Groups		71.907	398	.181		
	Total		71.910	399			

a. No variance within groups - statistics for MPenvi4 * Gender cannot be computed.

MPenvi1 MPenvi2 MPenvi3 MPenvi4 MPenvi5 MPenvi6 MPenvi7 MPenvi8 * ClassesAge

Report

ClassesAge		MPenvi1	MPenvi2	MPenvi3	MPenvi4	MPenvi5	MPenvi6	MPenvi7	MPenvi8
Young farmers	Mean	4.3557	3.1546	1.4536	1.0000	4.7320	4.5876	4.6907	1.7629
	N	194	194	194	194	194	194	194	194
	Std. Deviation	.62113	.97471	.62786	.00000	.54849	.49353	.46339	.42641
Old farmers	Mean	4.3058	3.1699	1.5388	1.0000	4.7718	4.6117	4.6796	1.7670
	N	206	206	206	206	206	206	206	206
	Std. Deviation	.57481	1.01466	.68855	.00000	.52395	.48856	.46776	.42378
Total	Mean	4.3300	3.1625	1.4975	1.0000	4.7525	4.6000	4.6850	1.7650
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.59749	.99427	.66037	.00000	.53569	.49051	.46510	.42453

ANOVA Table[a]

			Sum of Squares	df	Mean Square	F	Sig.
MPenvi1 * ClassesAge	Between Groups	(Combined)	.248	1	.248	.695	.405
	Within Groups		142.192	398	.357		
	Total		142.440	399			
MPenvi2 * ClassesAge	Between Groups	(Combined)	.023	1	.023	.023	.878
	Within Groups		394.414	398	.991		
	Total		394.438	399			
MPenvi3 * ClassesAge	Between Groups	(Combined)	.726	1	.726	1.667	.197
	Within Groups		173.272	398	.435		
	Total		173.997	399			
MPenvi5 * ClassesAge	Between Groups	(Combined)	.159	1	.159	.553	.457
	Within Groups		114.339	398	.287		
	Total		114.497	399			
MPenvi6 * ClassesAge	Between Groups	(Combined)	.058	1	.058	.239	.625
	Within Groups		95.942	398	.241		
	Total		96.000	399			
MPenvi7 * ClassesAge	Between Groups	(Combined)	.012	1	.012	.057	.812
	Within Groups		86.298	398	.217		
	Total		86.310	399			
MPenvi8 * ClassesAge	Between Groups	(Combined)	.002	1	.002	.009	.923
	Within Groups		71.908	398	.181		
	Total		71.910	399			

a. No variance within groups - statistics for MPenvi4 * ClassesAge cannot be computed.

MPenvi1 MPenvi2 MPenvi3 MPenvi4 MPenvi5 MPenvi6 MPenvi7 MPenvi8 * ClassesEducation

Report

ClassesEducation		MPenvi1	MPenvi2	MPenvi3	MPenvi4	MPenvi5	MPenvi6	MPenvi7	MPenvi8
None or primary	Mean	4.3103	3.1552	1.5747	1.0000	4.7586	4.5920	4.6667	1.7241
	N	174	174	174	174	174	174	174	174
	Std. Deviation	.58518	1.03357	.67374	.00000	.53686	.49289	.47276	.44824
Secondary and high school	Mean	4.3298	3.1152	1.4398	1.0000	4.7539	4.5969	4.7016	1.7906
	N	191	191	191	191	191	191	191	191
	Std. Deviation	.61653	.95550	.65316	.00000	.53032	.49182	.45877	.40797
Graduate and above	Mean	4.4286	3.4571	1.4286	1.0000	4.7143	4.6571	4.6857	1.8286
	N	35	35	35	35	35	35	35	35
	Std. Deviation	.55761	.98048	.60807	.00000	.57248	.48159	.47101	.38239
Total	Mean	4.3300	3.1625	1.4975	1.0000	4.7525	4.6000	4.6850	1.7650
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.59749	.99427	.66037	.00000	.53569	.49051	.46510	.42453

ANOVA Table[a]

			Sum of Squares	df	Mean Square	F	Sig.
MPenvi1 * ClassesEducation	Between Groups	(Combined)	.407	2	.204	.569	.566
	Within Groups		142.033	397	.358		
	Total		142.440	399			
MPenvi2 * ClassesEducation	Between Groups	(Combined)	3.475	2	1.738	1.765	.173
	Within Groups		390.962	397	.985		
	Total		394.437	399			
MPenvi3 * ClassesEducation	Between Groups	(Combined)	1.840	2	.920	2.121	.121
	Within Groups		172.158	397	.434		
	Total		173.997	399			
MPenvi5 * ClassesEducation	Between Groups	(Combined)	.058	2	.029	.101	.904
	Within Groups		114.439	397	.288		
	Total		114.497	399			
MPenvi6 * ClassesEducation	Between Groups	(Combined)	.127	2	.064	.264	.768
	Within Groups		95.873	397	.241		
	Total		96.000	399			
MPenvi7 * ClassesEducation	Between Groups	(Combined)	.111	2	.055	.255	.775
	Within Groups		86.199	397	.217		
	Total		86.310	399			
MPenvi8 * ClassesEducation	Between Groups	(Combined)	.557	2	.278	1.549	.214
	Within Groups		71.353	397	.180		
	Total		71.910	399			

a. No variance within groups - statistics for MPenvi4 * ClassesEducation cannot be computed.

MPenvi1 MPenvi2 MPenvi3 MPenvi4 MPenvi5 MPenvi6 MPenvi7 MPenvi8 * ClassesTotalArea

Report

ClassesTotalArea		MPenvi1	MPenvi2	MPenvi3	MPenvi4	MPenvi5	MPenvi6	MPenvi7	MPenvi8
Smallholder	Mean	4.3313	3.1503	1.5184	1.0000	4.7699	4.6074	4.6963	1.7791
	N	326	326	326	326	326	326	326	326
	Std. Deviation	.60820	1.01320	.66884	.00000	.51960	.48909	.46055	.41546
Largeholder	Mean	4.3243	3.2162	1.4054	1.0000	4.6757	4.5676	4.6351	1.7027
	N	74	74	74	74	74	74	74	74
	Std. Deviation	.55166	.91067	.61753	.00000	.59927	.49880	.48468	.46019
Total	Mean	4.3300	3.1625	1.4975	1.0000	4.7525	4.6000	4.6850	1.7650
	N	400	400	400	400	400	400	400	400
	Std. Deviation	.59749	.99427	.66037	.00000	.53569	.49051	.46510	.42453

ANOVA Table[a]

			Sum of Squares	df	Mean Square	F	Sig.
MPenvi1 * ClassesTotalArea	Between Groups	(Combined)	.003	1	.003	.008	.928
	Within Groups		142.437	398	.358		
	Total		142.440	399			
MPenvi2 * ClassesTotalArea	Between Groups	(Combined)	.262	1	.262	.265	.607
	Within Groups		394.176	398	.990		
	Total		394.438	399			
MPenvi3 * ClassesTotalArea	Between Groups	(Combined)	.770	1	.770	1.769	.184
	Within Groups		173.227	398	.435		
	Total		173.997	399			
MPenvi5 * ClassesTotalArea	Between Groups	(Combined)	.536	1	.536	1.872	.172
	Within Groups		113.962	398	.286		
	Total		114.497	399			
MPenvi6 * ClassesTotalArea	Between Groups	(Combined)	.096	1	.096	.396	.529
	Within Groups		95.904	398	.241		
	Total		96.000	399			
MPenvi7 * ClassesTotalArea	Between Groups	(Combined)	.226	1	.226	1.044	.308
	Within Groups		86.084	398	.216		
	Total		86.310	399			
MPenvi8 * ClassesTotalArea	Between Groups	(Combined)	.352	1	.352	1.960	.162
	Within Groups		71.558	398	.180		
	Total		71.910	399			

a. No variance within groups - statistics for MPenvi4 * ClassesTotalArea cannot be computed.

Report

	MPfood1	MPfood2	MPfood3	MPfood4	MPfood5	MPfood6	MPfood7
Mean	4.5650	4.4150	2.2000	1.9225	1.4675	2.5575	1.0150
N	400	400	400	400	400	400	400
Std. Deviation	.49638	.49334	.54841	.47651	.49957	.57665	.12170

MPfood1 MPfood2 MPfood3 MPfood4 MPfood5 MPfood6 MPfood7 * Gender

Report

Gender		MPfood1	MPfood2	MPfood3	MPfood4	MPfood5	MPfood6	MPfood7
Male	Mean	4.5461	4.3882	2.2237	1.9112	1.4737	2.5757	1.0197
	N	304	304	304	304	304	304	304
	Std. Deviation	.49870	.48813	.58244	.48271	.50013	.56364	.13932
Female	Mean	4.6250	4.5000	2.1250	1.9583	1.4479	2.5000	1.0000
	N	96	96	96	96	96	96	96
	Std. Deviation	.48666	.50262	.41675	.45692	.49989	.61559	.00000
Total	Mean	4.5650	4.4150	2.2000	1.9225	1.4675	2.5575	1.0150
	N	400	400	400	400	400	400	400
	Std. Deviation	.49638	.49334	.54841	.47651	.49957	.57665	.12170

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPfood1 * Gender	Between Groups	(Combined)	.455	1	.455	1.850	.175
	Within Groups		97.855	398	.246		
	Total		98.310	399			
MPfood2 * Gender	Between Groups	(Combined)	.913	1	.913	3.776	.053
	Within Groups		96.197	398	.242		
	Total		97.110	399			
MPfood3 * Gender	Between Groups	(Combined)	.711	1	.711	2.371	.124
	Within Groups		119.289	398	.300		
	Total		120.000	399			
MPfood4 * Gender	Between Groups	(Combined)	.162	1	.162	.714	.399
	Within Groups		90.435	398	.227		
	Total		90.598	399			
MPfood5 * Gender	Between Groups	(Combined)	.048	1	.048	.194	.660
	Within Groups		99.529	398	.250		
	Total		99.577	399			
MPfood6 * Gender	Between Groups	(Combined)	.418	1	.418	1.257	.263
	Within Groups		132.260	398	.332		
	Total		132.677	399			
MPfood7 * Gender	Between Groups	(Combined)	.028	1	.028	1.923	.166
	Within Groups		5.882	398	.015		
	Total		5.910	399			

MPfood1 MPfood2 MPfood3 MPfood4 MPfood5 MPfood6 MPfood7 * ClassesAge

Report

ClassesAge		MPfood1	MPfood2	MPfood3	MPfood4	MPfood5	MPfood6	MPfood7
Young farmers	Mean	4.5773	4.4021	2.1907	1.9691	1.4639	2.5361	1.0103
	N	194	194	194	194	194	194	194
	Std. Deviation	.49526	.49158	.48790	.45419	.49999	.60330	.10127
Old farmers	Mean	4.5534	4.4272	2.2087	1.8786	1.4709	2.5777	1.0194
	N	206	206	206	206	206	206	206
	Std. Deviation	.49835	.49587	.60091	.49370	.50037	.55108	.13832
Total	Mean	4.5650	4.4150	2.2000	1.9225	1.4675	2.5575	1.0150
	N	400	400	400	400	400	400	400
	Std. Deviation	.49638	.49334	.54841	.47651	.49957	.57665	.12170

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPfood1 * ClassesAge	Between Groups	(Combined)	.057	1	.057	.232	.631
	Within Groups		98.253	398	.247		
	Total		98.310	399			
MPfood2 * ClassesAge	Between Groups	(Combined)	.063	1	.063	.259	.611
	Within Groups		97.047	398	.244		
	Total		97.110	399			
MPfood3 * ClassesAge	Between Groups	(Combined)	.032	1	.032	.108	.743
	Within Groups		119.968	398	.301		
	Total		120.000	399			
MPfood4 * ClassesAge	Between Groups	(Combined)	.817	1	.817	3.622	.058
	Within Groups		89.780	398	.226		
	Total		90.597	399			
MPfood5 * ClassesAge	Between Groups	(Combined)	.005	1	.005	.019	.890
	Within Groups		99.573	398	.250		
	Total		99.577	399			
MPfood6 * ClassesAge	Between Groups	(Combined)	.173	1	.173	.519	.472
	Within Groups		132.505	398	.333		
	Total		132.678	399			
MPfood7 * ClassesAge	Between Groups	(Combined)	.008	1	.008	.559	.455
	Within Groups		5.902	398	.015		
	Total		5.910	399			

MPfood1 MPfood2 MPfood3 MPfood4 MPfood5 MPfood6 MPfood7 * ClassesEducation

Report

ClassesEducation		MPfood1	MPfood2	MPfood3	MPfood4	MPfood5	MPfood6	MPfood7
None or primary	Mean	4.5517	4.4080	2.1782	1.9425	1.4655	2.5632	1.0115
	N	174	174	174	174	174	174	174
	Std. Deviation	.49875	.49289	.54549	.48934	.50025	.56284	.10690
Secondary and high school	Mean	4.5602	4.3927	2.2251	1.9005	1.4607	2.5445	1.0105
	N	191	191	191	191	191	191	191
	Std. Deviation	.49767	.48963	.53959	.47633	.49977	.57753	.10206
Graduate and above	Mean	4.6571	4.5714	2.1714	1.9429	1.5143	2.6000	1.0571
	N	35	35	35	35	35	35	35
	Std. Deviation	.48159	.50210	.61767	.41606	.50709	.65079	.23550
Total	Mean	4.5650	4.4150	2.2000	1.9225	1.4675	2.5575	1.0150
	N	400	400	400	400	400	400	400
	Std. Deviation	.49638	.49334	.54841	.47651	.49957	.57665	.12170

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPfood1 * ClassesEducation	Between Groups	(Combined)	.332	2	.166	.673	.511
	Within Groups		97.978	397	.247		
	Total		98.310	399			
MPfood2 * ClassesEducation	Between Groups	(Combined)	.960	2	.480	1.982	.139
	Within Groups		96.150	397	.242		
	Total		97.110	399			
MPfood3 * ClassesEducation	Between Groups	(Combined)	.232	2	.116	.385	.681
	Within Groups		119.768	397	.302		
	Total		120.000	399			
MPfood4 * ClassesEducation	Between Groups	(Combined)	.177	2	.088	.388	.679
	Within Groups		90.421	397	.228		
	Total		90.598	399			
MPfood5 * ClassesEducation	Between Groups	(Combined)	.086	2	.043	.172	.842
	Within Groups		99.491	397	.251		
	Total		99.577	399			
MPfood6 * ClassesEducation	Between Groups	(Combined)	.101	2	.051	.151	.859
	Within Groups		132.576	397	.334		
	Total		132.678	399			
MPfood7 * ClassesEducation	Between Groups	(Combined)	.068	2	.034	2.318	.100
	Within Groups		5.842	397	.015		
	Total		5.910	399			

MPfood1 MPfood2 MPfood3 MPfood4 MPfood5 MPfood6 MPfood7 * ClassesTotalArea

Report

ClassesTotalArea		MPfood1	MPfood2	MPfood3	MPfood4	MPfood5	MPfood6	MPfood7
Smallholder	Mean	4.5828	4.4172	2.2117	1.9110	1.4448	2.5583	1.0184
	N	326	326	326	326	326	326	326
	Std. Deviation	.49385	.49385	.56676	.47852	.49771	.57751	.13462
Largeholder	Mean	4.4865	4.4054	2.1486	1.9730	1.5676	2.5541	1.0000
	N	74	74	74	74	74	74	74
	Std. Deviation	.50323	.49432	.45878	.46737	.49880	.57676	.00000
Total	Mean	4.5650	4.4150	2.2000	1.9225	1.4675	2.5575	1.0150
	N	400	400	400	400	400	400	400
	Std. Deviation	.49638	.49334	.54841	.47651	.49957	.57665	.12170

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
MPfood1 * ClassesTotalArea	Between Groups	(Combined)	.560	1	.560	2.279	.132
	Within Groups		97.750	398	.246		
	Total		98.310	399			
MPfood2 * ClassesTotalArea	Between Groups	(Combined)	.008	1	.008	.034	.853
	Within Groups		97.102	398	.244		
	Total		97.110	399			
MPfood3 * ClassesTotalArea	Between Groups	(Combined)	.239	1	.239	.796	.373
	Within Groups		119.761	398	.301		
	Total		120.000	399			
MPfood4 * ClassesTotalArea	Between Groups	(Combined)	.231	1	.231	1.019	.313
	Within Groups		90.366	398	.227		
	Total		90.597	399			
MPfood5 * ClassesTotalArea	Between Groups	(Combined)	.909	1	.909	3.667	.056
	Within Groups		98.668	398	.248		
	Total		99.578	399			
MPfood6 * ClassesTotalArea	Between Groups	(Combined)	.001	1	.001	.003	.955
	Within Groups		132.676	398	.333		
	Total		132.678	399			
MPfood7 * ClassesTotalArea	Between Groups	(Combined)	.020	1	.020	1.381	.241
	Within Groups		5.890	398	.015		
	Total		5.910	399			

Analytic Hierarchy Process Calculation

General Farmers' Perception

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	5	4	2
Eco	3	1	6	6	3
Soc	0.2	0.17	1	0.5	0.25
Env	0.25	0.17	2	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	24.30%	2	6.80%	6.80%
2	Economic System Impact	46.50%	1	15.70%	15.70%
3	Social System Impact	4.90%	5	1.60%	1.60%
4	Environmental Impact	6.70%	4	1.90%	1.90%
5	Food Security Impact	17.60%	3	5.20%	5.20%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.25	0.17	0.17	2
Eco	3	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	0.5	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	5.90%	4	1.90%	1.90%
2	Economic System Impact	14.10%	3	5.70%	5.70%
3	Social System Impact	42.90%	1	14.80%	14.80%
4	Environmental Impact	32.70%	2	12.60%	12.60%
5	Food Security Impact	4.50%	5	1.60%	1.60%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	0.5	0.5	0.5	0.33	2
MP202	2	1	2	2	2	0.5	3
MP203	2	0.5	1	1	0.5	0.5	2
MP204	2	0.5	1	1	0.5	0.5	2
MP205	2	0.5	2	2	1	0.5	3
MP206	3	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	8.10%	6	2.10%	2.10%
2	MP202	20.30%	2	6.30%	6.30%
3	MP203	11.50%	4	2.40%	2.40%
4	MP204	11.50%	4	2.40%	2.40%
5	MP205	16.60%	3	4.60%	4.60%
6	MP206	26.10%	1	7.50%	7.50%
7	MP207	5.90%	7	1.40%	1.40%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.2	0.5
MP210	0.5	7	1	4	7
MP211	0.2	5	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.50%	1	14.80%	14.80%
2	MP209	3.60%	5	1.30%	1.30%
3	MP210	31.90%	2	10.80%	10.80%
4	MP211	13.00%	3	5.00%	5.00%
5	MP212	4.90%	4	1.40%	1.40%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	3	0.33
MP306	3	1	4	2
MP307	0.33	0.25	1	0.25
MP308	3	0.5	4	1

Cat		Priority	Rank	(+)	(-)
1	MP305	15.50%	3	5.10%	5.10%
2	MP306	44.90%	1	12.90%	12.90%
3	MP307	7.70%	4	2.40%	2.40%
4	MP308	31.80%	2	9.70%	9.70%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	8
MP406	0.5	1	0.5	7
MP407	0.5	2	1	7
MP408	0.12	0.14	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	44.10%	1	11.10%	11.10%
2	MP406	21.40%	3	5.60%	5.60%
3	MP407	30.30%	2	8.40%	8.40%
4	MP408	4.20%	4	1.00%	1.00%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	3
MP505	0.5	1	0.25	3
MP506	3	4	1	4
MP507	0.33	0.33	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	23.40%	2	5.50%	5.50%
2	MP505	15.70%	3	5.70%	5.70%
3	MP506	52.60%	1	15.50%	15.50%
4	MP507	8.30%	4	3.20%	3.20%

Farmers' Perception Classified by Gender

Male

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.30%	7.30%
2	Economic System Impact	46.70%	1	14.40%	14.40%
3	Social System Impact	5.10%	4	1.60%	1.60%
4	Environmental Impact	6.80%	4	2.10%	2.10%
5	Food Security Impact	17.90%	3	5.50%	5.50%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	0.17	0.17	2
Eco	3	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	0.5	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	6.20%	4	1.70%	1.70%
2	Economic System Impact	13.20%	3	4.30%	4.30%
3	Social System Impact	43.30%	1	14.10%	14.10%
4	Environmental Impact	32.80%	2	11.40%	11.40%
5	Food Security Impact	4.50%	4	1.60%	1.60%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	0.5	0.5	0.5	0.33	2
MP202	2	1	2	2	2	0.5	3
MP203	2	0.5	1	1	1	0.5	3
MP204	2	0.5	1	1	1	0.5	3
MP205	2	0.5	1	1	1	0.5	3
MP206	3	2	2	2	2	1	3
MP207	0.5	0.33	0.33	0.33	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	8.10%	6	1.70%	1.70%
2	MP202	20.40%	2	5.80%	5.80%
3	MP203	13.30%	3	2.00%	2.00%
4	MP204	13.30%	3	2.00%	2.00%
5	MP205	13.30%	3	2.00%	2.00%
6	MP206	26.20%	1	7.10%	7.10%
7	MP207	5.30%	7	1.70%	1.70%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.5
MP306	3	1	4	2
MP307	0.33	0.25	1	0.5
MP308	2	0.5	2	1

Cat		Priority	Rank	(+)	(-)
1	MP305	18.40%	3	7.00%	7.00%
2	MP306	46.40%	1	6.70%	6.70%
3	MP307	9.70%	4	2.80%	2.80%
4	MP308	25.40%	2	7.20%	7.20%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	1	7
MP407	0.5	1	1	7
MP408	0.14	0.14	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	43.90%	1	9.50%	9.50%
2	MP406	25.80%	2	3.70%	3.70%
3	MP407	25.80%	2	3.70%	3.70%
4	MP408	4.50%	4	1.20%	1.20%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	2
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.5	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	21.80%	2	4.70%	4.70%
2	MP505	14.50%	3	4.00%	4.00%
3	MP506	53.40%	1	10.10%	10.10%
4	MP507	10.20%	4	2.50%	2.50%

Female

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.11	0.11	0.11	0.11
Eco	9	1	0.5	0.5	0.5
Soc	9	2	1	0.5	0.5
Env	9	2	2	1	2
Food	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	2.60%	5	0.80%	0.80%
2	Economic System Impact	15.30%	4	4.70%	4.70%
3	Social System Impact	20.20%	3	6.30%	6.30%
4	Environmental Impact	35.20%	1	10.90%	10.90%
5	Food Security Impact	26.70%	2	8.30%	8.30%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.25	0.17	0.17	1
Eco	4	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	1	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	5.00%	4	1.30%	1.30%
2	Economic System Impact	14.00%	3	5.20%	5.20%
3	Social System Impact	43.20%	1	15.10%	15.10%
4	Environmental Impact	32.70%	2	12.50%	12.50%
5	Food Security Impact	5.00%	4	1.30%	1.30%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	1	1	0.5	0.5	2
MP202	2	1	2	2	2	0.5	3
MP203	1	0.5	1	1	0.5	0.5	2
MP204	1	0.5	1	1	0.5	0.5	2
MP205	2	0.5	2	2	1	0.5	3
MP206	2	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	10.40%	4	1.30%	1.30%
2	MP202	20.60%	2	6.20%	6.20%
3	MP203	10.40%	4	1.30%	1.30%
4	MP204	10.40%	4	1.30%	1.30%
5	MP205	16.80%	3	4.20%	4.20%
6	MP206	25.30%	1	8.40%	8.40%
7	MP207	6.00%	7	1.20%	1.20%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.33
MP306	3	1	4	0.5
MP307	0.5	0.25	1	0.25
MP308	3	2	4	1

Cat		Priority	Rank	(+)	(-)
1	MP305	13.90%	3	2.60%	2.60%
2	MP306	32.00%	2	7.70%	7.70%
3	MP307	8.60%	4	1.80%	1.80%
4	MP308	45.50%	1	12.40%	12.40%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	5	7	8
MP402	0.2	1	4	5
MP403	0.14	0.25	1	3
MP404	0.12	0.2	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	64.40%	1	28.40%	28.40%
2	MP402	22.00%	2	8.70%	8.70%
3	MP403	8.90%	3	3.40%	3.40%
4	MP404	4.70%	4	2.00%	2.00%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	0.5	1
MP407	0.5	2	1	7
MP408	0.14	1	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	45.40%	1	14.40%	14.40%
2	MP406	14.30%	3	5.80%	5.80%
3	MP407	32.50%	2	13.10%	13.10%
4	MP408	7.80%	4	4.00%	4.00%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	3
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.33	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	23.70%	2	4.70%	4.70%
2	MP505	14.10%	3	2.70%	2.70%
3	MP506	53.10%	1	13.90%	13.90%
4	MP507	9.10%	4	2.70%	2.70%

Farmers' Perception Classified by Age

Young Farmers

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.00%	7.00%
2	Economic System Impact	46.90%	1	14.60%	14.60%
3	Social System Impact	5.80%	4	1.20%	1.20%
4	Environmental Impact	5.80%	4	1.20%	1.20%
5	Food Security Impact	17.90%	3	4.80%	4.80%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.25	0.17	0.17	1
Eco	4	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	1	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	5.00%	4	1.30%	1.30%
2	Economic System Impact	14.00%	3	5.20%	5.20%
3	Social System Impact	43.20%	1	15.10%	15.10%
4	Environmental Impact	32.70%	2	12.50%	12.50%
5	Food Security Impact	5.00%	4	1.30%	1.30%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	0.5	0.5	0.5	0.33	2
MP202	2	1	2	2	2	0.5	3
MP203	2	0.5	1	1	1	0.5	3
MP204	2	0.5	1	1	1	0.5	3
MP205	2	0.5	1	1	1	0.5	3
MP206	3	2	2	2	2	1	3
MP207	0.5	0.33	0.33	0.33	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	8.10%	6	1.70%	1.70%
2	MP202	20.40%	2	5.80%	5.80%
3	MP203	13.30%	3	2.00%	2.00%
4	MP204	13.30%	3	2.00%	2.00%
5	MP205	13.30%	3	2.00%	2.00%
6	MP206	26.20%	1	7.10%	7.10%
7	MP207	5.30%	7	1.70%	1.70%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.33
MP306	3	1	4	0.5
MP307	0.5	0.25	1	0.25
MP308	3	2	4	1

Cat		Priority	Rank	(+)	(-)
1	MP305	13.90%	3	2.60%	2.60%
2	MP306	32.00%	2	7.70%	7.70%
3	MP307	8.60%	4	1.80%	1.80%
4	MP308	45.50%	1	12.40%	12.40%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	0.5	1
MP407	0.5	2	1	7
MP408	0.14	1	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	45.40%	1	14.40%	14.40%
2	MP406	14.30%	3	5.80%	5.80%
3	MP407	32.50%	2	13.10%	13.10%
4	MP408	7.80%	4	4.00%	4.00%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	3
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.33	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	23.70%	2	4.70%	4.70%
2	MP505	14.10%	3	2.70%	2.70%
3	MP506	53.10%	1	13.90%	13.90%
4	MP507	9.10%	4	2.70%	2.70%

Old Farmers

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.30%	7.30%
2	Economic System Impact	46.70%	1	14.40%	14.40%
3	Social System Impact	5.10%	4	1.60%	1.60%
4	Environmental Impact	6.80%	4	2.10%	2.10%
5	Food Security Impact	17.90%	3	5.50%	5.50%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	0.17	0.17	2
Eco	3	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	0.5	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	6.20%	4	1.70%	1.70%
2	Economic System Impact	13.20%	3	4.30%	4.30%
3	Social System Impact	43.30%	1	14.10%	14.10%
4	Environmental Impact	32.80%	2	11.40%	11.40%
5	Food Security Impact	4.50%	4	1.60%	1.60%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	0.5	0.5	0.5	0.5	2
MP202	2	1	2	2	2	0.5	3
MP203	2	0.5	1	1	0.5	0.5	2
MP204	2	0.5	1	1	0.5	0.5	2
MP205	2	0.5	2	2	1	0.5	3
MP206	2	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	8.70%	6	2.60%	2.60%
2	MP202	20.50%	2	6.40%	6.40%
3	MP203	11.60%	4	2.70%	2.70%
4	MP204	11.60%	4	2.70%	2.70%
5	MP205	16.70%	3	4.70%	4.70%
6	MP206	25.00%	1	8.30%	8.30%
7	MP207	5.90%	7	1.20%	1.20%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.5
MP306	3	1	4	2
MP307	0.33	0.25	1	0.5
MP308	2	0.5	2	1

Cat		Priority	Rank	(+)	(-)
1	MP305	18.40%	3	7.00%	7.00%
2	MP306	46.40%	1	6.70%	6.70%
3	MP307	9.70%	4	2.80%	2.80%
4	MP308	25.40%	2	7.20%	7.20%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	1	7
MP407	0.5	1	1	7
MP408	0.14	0.14	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	43.90%	1	9.50%	9.50%
2	MP406	25.80%	2	3.70%	3.70%
3	MP407	25.80%	2	3.70%	3.70%
4	MP408	4.50%	4	1.20%	1.20%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	2
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.5	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	21.80%	2	4.70%	4.70%
2	MP505	14.50%	3	4.00%	4.00%
3	MP506	53.40%	1	10.10%	10.10%
4	MP507	10.20%	4	2.50%	2.50%

Farmers' Perception Classified by Education

None or Primary

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.00%	7.00%
2	Economic System Impact	46.90%	1	14.60%	14.60%
3	Social System Impact	5.80%	4	1.20%	1.20%
4	Environmental Impact	5.80%	4	1.20%	1.20%
5	Food Security Impact	17.90%	3	4.80%	4.80%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.25	0.17	0.17	1
Eco	4	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	1	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	5.00%	4	1.30%	1.30%
2	Economic System Impact	14.00%	3	5.20%	5.20%
3	Social System Impact	43.20%	1	15.10%	15.10%
4	Environmental Impact	32.70%	2	12.50%	12.50%
5	Food Security Impact	5.00%	4	1.30%	1.30%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	2	2	1	0.5	2
MP202	2	1	2	2	2	0.5	3
MP203	0.5	0.5	1	1	0.5	0.5	2
MP204	0.5	0.5	1	1	0.5	0.5	2
MP205	1	0.5	2	2	1	0.5	3
MP206	2	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	14.20%	4	3.30%	3.30%
2	MP202	20.60%	2	6.00%	6.00%
3	MP203	9.50%	5	2.00%	2.00%
4	MP204	9.50%	5	2.00%	2.00%
5	MP205	15.00%	3	3.30%	3.30%
6	MP206	25.20%	1	8.10%	8.10%
7	MP207	6.00%	7	1.40%	1.40%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.33
MP306	3	1	4	0.5
MP307	0.5	0.25	1	0.25
MP308	3	2	4	1

Cat		Priority	Rank	(+)	(-)
1	MP305	13.90%	3	2.60%	2.60%
2	MP306	32.00%	2	7.70%	7.70%
3	MP307	8.60%	4	1.80%	1.80%
4	MP308	45.50%	1	12.40%	12.40%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	0.5	1
MP407	0.5	2	1	7
MP408	0.14	1	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	45.40%	1	14.40%	14.40%
2	MP406	14.30%	3	5.80%	5.80%
3	MP407	32.50%	2	13.10%	13.10%
4	MP408	7.80%	4	4.00%	4.00%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	3
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.33	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	23.70%	2	4.70%	4.70%
2	MP505	14.10%	3	2.70%	2.70%
3	MP506	53.10%	1	13.90%	13.90%
4	MP507	9.10%	4	2.70%	2.70%

Secondary or High School

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.30%	7.30%
2	Economic System Impact	46.70%	1	14.40%	14.40%
3	Social System Impact	5.10%	4	1.60%	1.60%
4	Environmental Impact	6.80%	4	2.10%	2.10%
5	Food Security Impact	17.90%	3	5.50%	5.50%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	0.17	0.17	2
Eco	3	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	0.5	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	6.20%	4	1.70%	1.70%
2	Economic System Impact	13.20%	3	4.30%	4.30%
3	Social System Impact	43.30%	1	14.10%	14.10%
4	Environmental Impact	32.80%	2	11.40%	11.40%
5	Food Security Impact	4.50%	4	1.60%	1.60%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	0.5	0.5	0.5	0.33	2
MP202	2	1	2	2	2	0.5	3
MP203	2	0.5	1	1	1	0.5	3
MP204	2	0.5	1	1	1	0.5	3
MP205	2	0.5	1	1	1	0.5	3
MP206	3	2	2	2	2	1	3
MP207	0.5	0.33	0.33	0.33	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	8.10%	6	1.70%	1.70%
2	MP202	20.40%	2	5.80%	5.80%
3	MP203	13.30%	3	2.00%	2.00%
4	MP204	13.30%	3	2.00%	2.00%
5	MP205	13.30%	3	2.00%	2.00%
6	MP206	26.20%	1	7.10%	7.10%
7	MP207	5.30%	7	1.70%	1.70%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.5
MP306	3	1	4	2
MP307	0.33	0.25	1	0.5
MP308	2	0.5	2	1

Cat		Priority	Rank	(+)	(-)
1	MP305	18.40%	3	7.00%	7.00%
2	MP306	46.40%	1	6.70%	6.70%
3	MP307	9.70%	4	2.80%	2.80%
4	MP308	25.40%	2	7.20%	7.20%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	1	7
MP407	0.5	1	1	7
MP408	0.14	0.14	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	43.90%	1	9.50%	9.50%
2	MP406	25.80%	2	3.70%	3.70%
3	MP407	25.80%	2	3.70%	3.70%
4	MP408	4.50%	4	1.20%	1.20%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	2
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.5	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	21.80%	2	4.70%	4.70%
2	MP505	14.50%	3	4.00%	4.00%
3	MP506	53.40%	1	10.10%	10.10%
4	MP507	10.20%	4	2.50%	2.50%

Graduate and Above

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.30%	7.30%
2	Economic System Impact	46.70%	1	14.40%	14.40%
3	Social System Impact	5.10%	4	1.60%	1.60%
4	Environmental Impact	6.80%	4	2.10%	2.10%
5	Food Security Impact	17.90%	3	5.50%	5.50%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	0.17	0.17	2
Eco	3	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	0.5	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	6.20%	4	1.70%	1.70%
2	Economic System Impact	13.20%	3	4.30%	4.30%
3	Social System Impact	43.30%	1	14.10%	14.10%
4	Environmental Impact	32.80%	2	11.40%	11.40%
5	Food Security Impact	4.50%	4	1.60%	1.60%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	2	2	1	0.5	2
MP202	2	1	2	2	2	0.5	3
MP203	0.5	0.5	1	1	0.5	0.5	2
MP204	0.5	0.5	1	1	0.5	0.5	2
MP205	1	0.5	2	2	1	0.5	3
MP206	2	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	14.20%	4	3.30%	3.30%
2	MP202	20.60%	2	6.00%	6.00%
3	MP203	9.50%	5	2.00%	2.00%
4	MP204	9.50%	5	2.00%	2.00%
5	MP205	15.00%	3	3.30%	3.30%
6	MP206	25.20%	1	8.10%	8.10%
7	MP207	6.00%	7	1.40%	1.40%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	2	3	4
MP302	1	0.25	6	6
MP303	4	1	8	7
MP304	0.17	0.12	1	0.5

Cat		Priority	Rank	(+)	(-)
1	MP301	27.00%	2	10.60%	10.60%
2	MP302	61.00%	1	28.80%	28.80%
3	MP303	4.90%	4	1.70%	1.70%
4	MP304	7.10%	3	2.20%	2.20%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.5
MP306	3	1	4	2
MP307	0.33	0.25	1	0.5
MP308	2	0.5	2	1

Cat		Priority	Rank	(+)	(-)
1	MP305	18.40%	3	7.00%	7.00%
2	MP306	46.40%	1	6.70%	6.70%
3	MP307	9.70%	4	2.80%	2.80%
4	MP308	25.40%	2	7.20%	7.20%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	1	7
MP407	0.5	1	1	7
MP408	0.14	0.14	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	43.90%	1	9.50%	9.50%
2	MP406	25.80%	2	3.70%	3.70%
3	MP407	25.80%	2	3.70%	3.70%
4	MP408	4.50%	4	1.20%	1.20%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	2
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.5	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	21.80%	2	4.70%	4.70%
2	MP505	14.50%	3	4.00%	4.00%
3	MP506	53.40%	1	10.10%	10.10%
4	MP507	10.20%	4	2.50%	2.50%

Farmers' Perception Classified by Farm Size

Smallholder

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.00%	7.00%
2	Economic System Impact	46.90%	1	14.60%	14.60%
3	Social System Impact	5.80%	4	1.20%	1.20%
4	Environmental Impact	5.80%	4	1.20%	1.20%
5	Food Security Impact	17.90%	3	4.80%	4.80%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.25	0.17	0.17	1
Eco	4	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	1	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	5.00%	4	1.30%	1.30%
2	Economic System Impact	14.00%	3	5.20%	5.20%
3	Social System Impact	43.20%	1	15.10%	15.10%
4	Environmental Impact	32.70%	2	12.50%	12.50%
5	Food Security Impact	5.00%	4	1.30%	1.30%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	1	1	0.5	0.5	2
MP202	2	1	2	2	2	0.5	3
MP203	1	0.5	1	1	0.5	0.5	2
MP204	1	0.5	1	1	0.5	0.5	2
MP205	2	0.5	2	2	1	0.5	3
MP206	2	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	10.40%	4	1.30%	1.30%
2	MP202	20.60%	2	6.20%	6.20%
3	MP203	10.40%	4	1.30%	1.30%
4	MP204	10.40%	4	1.30%	1.30%
5	MP205	16.80%	3	4.20%	4.20%
6	MP206	25.30%	1	8.40%	8.40%
7	MP207	6.00%	7	1.20%	1.20%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.33
MP306	3	1	4	0.5
MP307	0.5	0.25	1	0.25
MP308	3	2	4	1

Cat		Priority	Rank	(+)	(-)
1	MP305	13.90%	3	2.60%	2.60%
2	MP306	32.00%	2	7.70%	7.70%
3	MP307	8.60%	4	1.80%	1.80%
4	MP308	45.50%	1	12.40%	12.40%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	0.5	1
MP407	0.5	2	1	7
MP408	0.14	1	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	45.40%	1	14.40%	14.40%
2	MP406	14.30%	3	5.80%	5.80%
3	MP407	32.50%	2	13.10%	13.10%
4	MP408	7.80%	4	4.00%	4.00%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	3
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.33	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	23.70%	2	4.70%	4.70%
2	MP505	14.10%	3	2.70%	2.70%
3	MP506	53.10%	1	13.90%	13.90%
4	MP507	9.10%	4	2.70%	2.70%

Largeholder

Positive Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	4	4	2
Eco	3	1	6	6	3
Soc	0.25	0.17	1	1	0.25
Env	0.25	0.17	1	1	0.25
Food	0.5	0.33	4	4	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	23.60%	2	7.30%	7.30%
2	Economic System Impact	46.70%	1	14.40%	14.40%
3	Social System Impact	5.10%	4	1.60%	1.60%
4	Environmental Impact	6.80%	4	2.10%	2.10%
5	Food Security Impact	17.90%	3	5.50%	5.50%

Negative Impact

	Pro	Eco	Soc	Env	Food
Pro	1	0.33	0.17	0.17	2
Eco	3	1	0.25	0.25	4
Soc	6	4	1	2	6
Env	6	4	0.5	1	6
Food	0.5	0.25	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	Production System Impacts	6.20%	4	1.70%	1.70%
2	Economic System Impact	13.20%	3	4.30%	4.30%
3	Social System Impact	43.30%	1	14.10%	14.10%
4	Environmental Impact	32.80%	2	11.40%	11.40%
5	Food Security Impact	4.50%	4	1.60%	1.60%

Positive Impact in Production System

	MP101	MP102	MP103	MP104	MP105
MP101	1	0.12	0.11	0.11	0.11
MP102	8	1	0.5	0.5	0.5
MP103	9	2	1	0.5	0.5
MP104	9	2	2	1	2
MP105	9	2	2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP101	2.60%	5	0.80%	0.80%
2	MP102	14.90%	4	4.00%	4.00%
3	MP103	20.30%	3	6.00%	6.00%
4	MP104	35.40%	1	11.00%	11.00%
5	MP105	26.80%	2	8.20%	8.20%

Negative Impact in Production System

	MP106	MP107	MP108
MP106	1	5	5
MP107	0.2	1	2
MP108	0.2	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP106	70.90%	1	16.30%	16.30%
2	MP107	17.90%	2	4.10%	4.10%
3	MP108	11.30%	3	2.60%	2.60%

Positive Impact in Economic System

	MP201	MP202	MP203	MP204	MP205	MP206	MP207
MP201	1	0.5	1	1	0.5	0.5	2
MP202	2	1	2	2	2	0.5	3
MP203	1	0.5	1	1	0.5	0.5	2
MP204	1	0.5	1	1	0.5	0.5	2
MP205	2	0.5	2	2	1	0.5	3
MP206	2	2	2	2	2	1	3
MP207	0.5	0.33	0.5	0.5	0.33	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP201	10.40%	4	1.30%	1.30%
2	MP202	20.60%	2	6.20%	6.20%
3	MP203	10.40%	4	1.30%	1.30%
4	MP204	10.40%	4	1.30%	1.30%
5	MP205	16.80%	3	4.20%	4.20%
6	MP206	25.30%	1	8.40%	8.40%
7	MP207	6.00%	7	1.20%	1.20%

Negative Impact in Economic System

	MP208	MP209	MP210	MP211	MP212
MP208	1	8	2	5	8
MP209	0.12	1	0.14	0.25	0.5
MP210	0.5	7	1	4	7
MP211	0.2	4	0.25	1	4
MP212	0.12	2	0.14	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP208	46.70%	1	13.80%	13.80%
2	MP209	3.80%	5	1.20%	1.20%
3	MP210	32.00%	2	9.90%	9.90%
4	MP211	12.50%	3	4.60%	4.60%
5	MP212	5.00%	4	1.60%	1.60%

Positive Impact in Social System

	MP301	MP302	MP303	MP304
MP301	1	0.25	5	6
MP302	4	1	7	8
MP303	0.2	0.14	1	2
MP304	0.17	0.12	0.5	1

Cat		Priority	Rank	(+)	(-)
1	MP301	26.00%	2	8.80%	8.80%
2	MP302	61.60%	1	26.60%	26.60%
3	MP303	7.50%	3	1.90%	1.90%
4	MP304	5.00%	4	1.70%	1.70%

Negative Impact in Social System

	MP305	MP306	MP307	MP308
MP305	1	0.33	2	0.5
MP306	3	1	4	2
MP307	0.33	0.25	1	0.5
MP308	2	0.5	2	1

Cat		Priority	Rank	(+)	(-)
1	MP305	18.40%	3	7.00%	7.00%
2	MP306	46.40%	1	6.70%	6.70%
3	MP307	9.70%	4	2.80%	2.80%
4	MP308	25.40%	2	7.20%	7.20%

Positive Impact in Environmental

	MP401	MP402	MP403	MP404
MP401	1	4	7	8
MP402	0.25	1	5	6
MP403	0.14	0.2	1	3
MP404	0.12	0.17	0.33	1

Cat		Priority	Rank	(+)	(-)
1	MP401	61.10%	1	26.50%	26.50%
2	MP402	26.00%	2	10.40%	10.40%
3	MP403	8.40%	3	3.30%	3.30%
4	MP404	4.50%	4	1.90%	1.90%

Negative Impact in Environmental

	MP405	MP406	MP407	MP408
MP405	1	2	2	7
MP406	0.5	1	1	7
MP407	0.5	1	1	7
MP408	0.14	0.14	0.14	1

Cat		Priority	Rank	(+)	(-)
1	MP405	43.90%	1	9.50%	9.50%
2	MP406	25.80%	2	3.70%	3.70%
3	MP407	25.80%	2	3.70%	3.70%
4	MP408	4.50%	4	1.20%	1.20%

Positive Impact in Food Security

1	MP501	MP502	MP503
MP501	1	2	6
MP502	0.5	1	6
MP503	0.17	0.17	1

Cat		Priority	Rank	(+)	(-)
1	MP501	56.70%	1	13.00%	13.00%
2	MP502	35.70%	2	8.20%	8.20%
3	MP503	7.50%	3	1.70%	1.70%

Negative Impact in Food Security

	MP504	MP505	MP506	MP507
MP504	1	2	0.33	2
MP505	0.5	1	0.25	2
MP506	3	4	1	4
MP507	0.5	0.5	0.25	1

Cat		Priority	Rank	(+)	(-)
1	MP504	21.80%	2	4.70%	4.70%
2	MP505	14.50%	3	4.00%	4.00%
3	MP506	53.40%	1	10.10%	10.10%
4	MP507	10.20%	4	2.50%	2.50%

UNIVERSIDADE DE ÉVORA
INSTITUTO DE INVESTIGAÇÃO
E FORMAÇÃO AVANÇADA

Contactos:

Universidade de Évora

Instituto de Investigação e Formação Avançada - IIFA

Palácio do Vimioso | Largo Marquês de Marialva, Apart. 94

7002-554 Évora | Portugal

Tel: (+351) 266 706 581