# CHAPTER 1

INTRODUCTION

1.1 Introduction

A broad range of concerns surrounding land use in the global context impacts on palm oil production as an economic sector. The world's population is growing rapidly, and this puts great pressure on food production. More than 99 per cent of the world's food supply comes from the land, while less than 1 per cent is from oceans and other aquatic habitats (Pimentel et al., 1995). At present, fertile cropland is being lost at an alarming rate. In fact, nearly one-third (1.5 billion hectares) of the world's cropland has been abandoned over the past 40 years because erosion and over-farming have made it unproductive (Pimentel et al., 1995).

Therefore, land has to be used for optimum output for the benefit of all, and to meet the world's consumption needs. In such a scenario, palm oil becomes a significant crop. Oil palm gives the highest yield per hectare among all oilseed crops (Oil World, 2010) as indicated in *Figure 1.1*. It thus has great importance in terms of resource optimisation and sustaining the productivity of land.
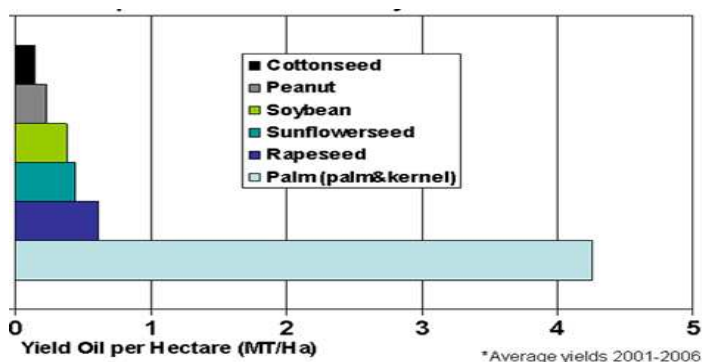

Source: Oil World, 2010

Figure 1.1: Comparative yields of major world oil seeds

Oil Palm is grown across the tropics, in South East Asia, Central and West Africa, and Central America. The crop is prized for its fruit, from which palm oil is extracted. Palm oil has many uses: it is consumed locally as cooking oil, manufactured into many commercial food and personal care products and, recently, it is being converted into biofuel to replace fossil fuels. An estimated 1.5 million small farmers grow the crop in Indonesia, along with about 600,000 people directly employed in the sector in Malaysia, in addition to a significant number engaged in related industries (MPOC, 2012). For Malaysia, palm oil is the leading export earner among the primary commodities, and revenue for 2011 was estimated atRM80.4 billion, accounting for 11% of export earnings (MPOC, 2012).

The attractive earnings from palm oil have fuelled the industry's growth in recent decades, particularly in Malaysia and Indonesia. In 2008, the cumulative land area of oil palm plantations in Malaysia had reached approximately 11 million hectares. In 2005, it accounted for about half of the world's oil palm crop, with about half a billion perennial carbon-sequestering palm trees (Basiron, 2012). The harvested area of palm oil in Southeast Asia has tripled in just a decade. In Indonesia, oil palm cover grew by 11.5% annually from 1997 to 2000, and by 15.8 % annually from 2000 to 2007. To a much lesser extent, cultivation also occurs in a few South Asian, South American, and West African countries.

The impact of the palm oil sector's expansion on the tropical rainforests of the region has been significant. Deforestation in Indonesia for palm oil (and illegal logging) is so rapid that a 2007 United Nations Environment Program (UNEP, 2007) report said that most of the country's forest might be destroyed by 2022.

Rising demand is driving landowners to clear tropical forest to plant oil palm. According to UNEP (2007), at the current rate (*Figure 1.2*) of intrusion into South-east Asian's national parks, it is likely that many protected rainforests will be severely degraded by 2012 through illegal hunting and trade, logging, and forest fires, including those associated with the rapid spread of oil palm plantations. In Indonesia, its area grew by 11.5% annually from 1997 to 2000, and by 15.8% annually from 2000 to 2007, UNEP, (2007).
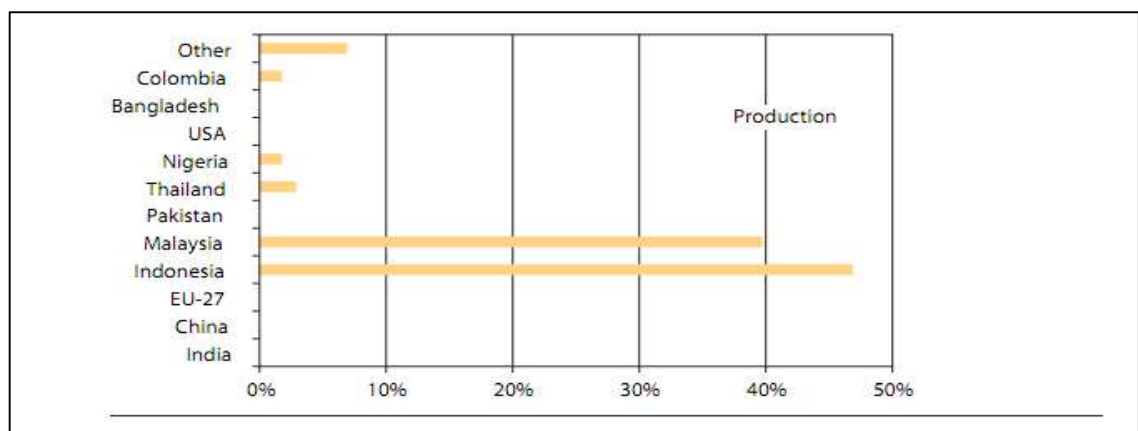

Source: UNEP, 2007

Figure 1.2: The Harvested Area of Oil Palm in South East Asia has Tripled in Just a Decade.

In the two countries responsible for over 80% of world palm oil production, Indonesia and Malaysia, smallholders account for 35–40% of the total planted area and as much as 33% of the output. Elsewhere, such as in the West African countries that produce mainly for domestic and regional markets, smallholders produce up to 90% of the annual harvest. Almost, 30% of the world's edible oil supply comes from one crop: palm oil. This high-yielding crop is critical to the world's food and possibly energy supply.

In Africa, the situation is very different compared to Indonesia or Malaysia. The United Nations Development Program says, in its Human Development Report 2007-2008, that production of palm oil in West-Africa is largely sustainable, mainly because it is undertaken on a smallholder level in small schemes mixed with forest and other produce, without resorting to diversity-damaging monoculture. The United Nations Food and Agriculture Organisation are encouraging small farmers across Africa to grow palm oil, because the crop offers opportunities to improve livelihoods and incomes for the poor. Large-scale deforestation and harm caused to the environment has raised the concern of consumers and non-government organisations (NGOs) across the world. This pressure has created serious friction between producers and NGOs. The Earth is under threat from a growing population and scarce natural resources, and sustainable agriculture is critical in the 21st century (Sheil et al., 2009). As the global demand for consumer goods grows, fuelling the production of the full range of products derived from vegetable oils from food to detergents, it is very apparent from the UNDP 2006 Report (**Figures 1.3**) that the demand for edible oils will continue to increase.
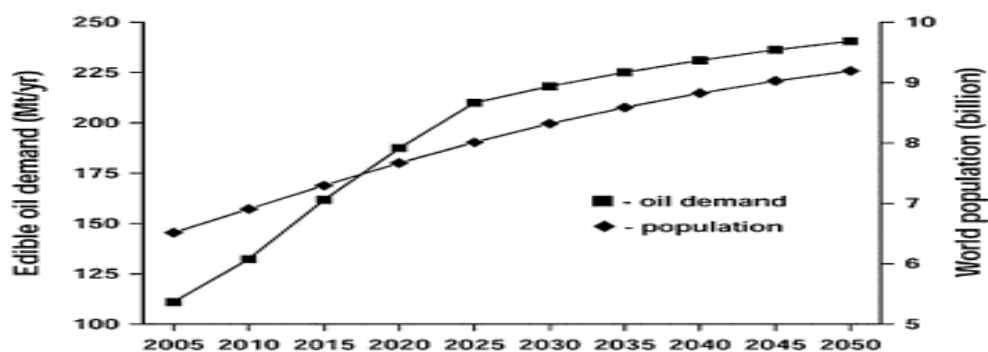
Source: UNDP, 2006

Figure 1.3: Expected Trends in World Population: By 2020, Edible Oil Supply is Expected to Meet the World Population Demand.

Natural resources will be the defining factor that dictates how well the human population would progress and where the focal points of growth and development will be. All natural resources like forests, water supply and minerals are very much land-dependent, just as human development is as well. The availability of land is the basic determinant for the next stage of human society's plan for progress. It will be the single most limiting, non-renewable factor in most if not all forms of development. Deforestation and biodiversity loss, as well as the impacts of climate change are the main criticisms against the type of agricultural development that is being pursued in South-east Asia, including Malaysia.

1.2 Sustainability and the Roundtable Concept

There are many definitions of sustainable agriculture, organic farming and ecological farming. Sustainable agriculture is characterised by managing the land as a living system in which the farmer/grower acts to support a dynamic balance among the plants, animals, insects, soil, and water. The essential characteristic of sustainable agriculture is to see the land as a living system embedded in a broader ecosystem and understanding how to manage all farm practices on the basis of this holistic perception.

There are many forms of sustainable production, including:

- ❑ Sustainable Palm Oil: The Roundtable on Sustainable Palm Oil (RSPO) is an international multi-stakeholder organization and certification scheme for sustainable palm oil; the International Sustainability and Carbon Certification (ISCC), Indonesian Sustainable Palm Oil (ISPO) and Malaysian Sustainable Palm Oil are agencies that promote and certify sustainable palm oil.

- ❑ Sustainable Fisheries: Some organisations certify fishing industry players that adopt sustainable or good practices (Marine Stewardship Council and Friend of

the Sea). Among the tools key use is a set of Ten Commandments for ecosystem-based fisheries drawn up by scientists.

- ❑ Sustainable Forestry: The Forest Stewardship Council (FSC) promotes responsible management of the world's forests through standard-setting, independent certification and labelling of forest products.

Similar initiatives have been established for other sectors, and they include: the Roundtable on Sustainable Biofuel; Roundtable on Sustainable Forests; Roundtable on Sustainable Development; Roundtable on Responsible Soy; and the Roundtable on Sustainable Cocoa Economy. All these initiatives have similar motives in trying to drive industry and agriculture towards sustainable practices.

1.3 What is Sustainable Palm Oil?

The RSPO was formed in 2004 by a diverse group of stakeholders in the palm oil industry to promote sustainable agriculture and address the environmental impacts of palm oil. The RSPO practises the philosophy of the "roundtable" by giving equal rights to each stakeholder group to bring group-specific agenda to the roundtable, facilitating traditionally adversarial stakeholders and business competitors to work together towards a common objective and making decisions by consensus (Aikanathan, 2010).

The RSPO has adopted the Brundtland definition for sustainable development and has put in place standards that begins from good environmental, social and agricultural practices: where the oil palm is first planted and grown to its final destination, whether it is on the plate of a consumer or in other products.
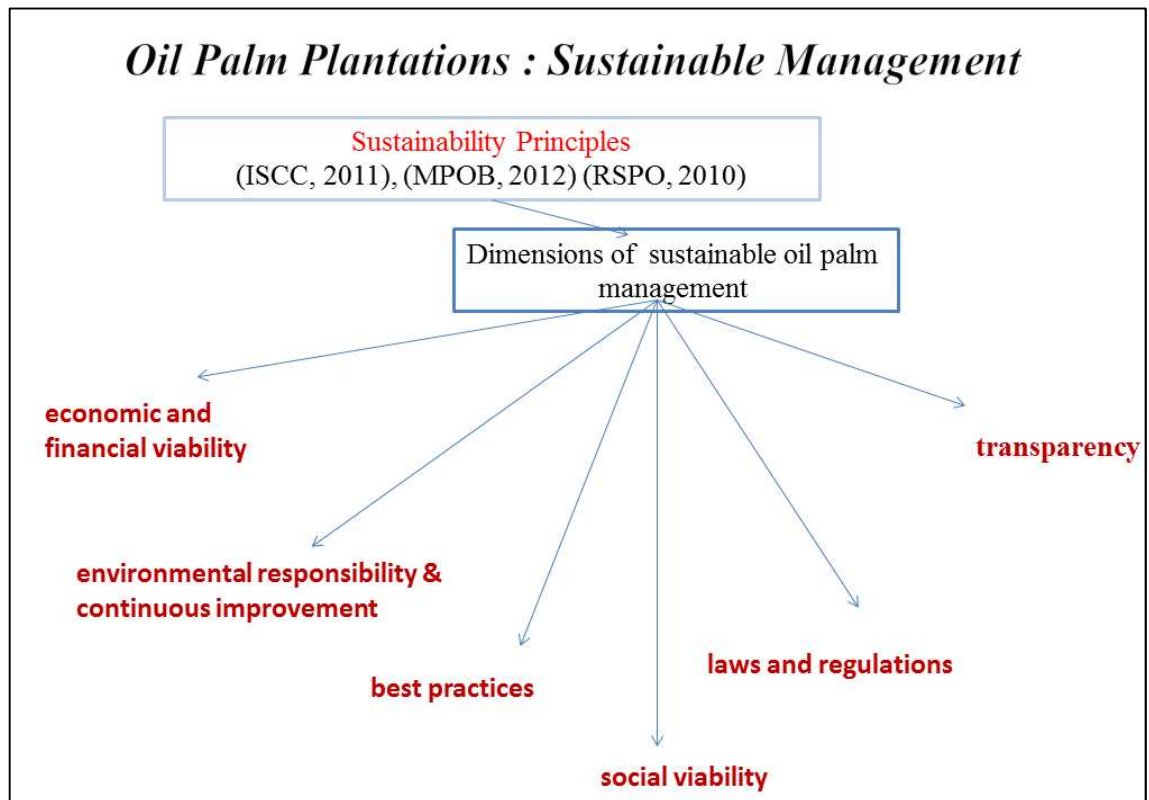
Source Author, 2013

Figure 1.4: Dimensions in Sustainable Management of Palm Oil

The palm oil industry is the first to have certified sustainable produce through the RSPO certification. The sustainability measurements adopted by RSPO include 8 principles, 39 criteria, 126 indicators and guidance (needs explanation). These standards address the legal, economic, environmental and social requirements of producing sustainable palm oil (RSPO, 2010). *Figure 1.4* depicts the main dimensions of sustainable oil palm management principles.

Countries like Germany have developed their own sustainability standards, propagated through the ISCC (International Sustainability and Carbon Certification) system, and Indonesia has its ISPO (Indonesian Sustainable Palm Oil). All these efforts are to ensure

production of sustainable agriculture produce in the form of CPO (crude palm oil) and PKO (palm kernel oil) for the vegetable fat market worldwide.

1.4 Study Motivation

Governments have also taken the initiative to promote sustainable agriculture. The Malaysian Government through the Malaysian Palm Oil agencies are in the process of establishing the "Malaysian Responsible Palm Oil" certification scheme. Indonesia is developing its own standard. Membership in the Indonesia Roundtable on Sustainable Palm Oil (ISPO) will be made compulsory for all Indonesian plantation companies (Suharto, 2012). The palm oil industry is providing a way for the agricultural industry to go green and sustainable. The effort is not complete, but it seems a viable means of overcoming the negativity surrounding the industry.

1.5 Problem Statement

The problem statement for this study: "The Oil Palm plantations are deemed unsustainable by NGOs and many importing nations, even though the Malaysian growers act according to a sustainability code of conduct determined by Malaysian authorities." Therefore, gaps exist with regards to determinates for sustainable management amongst the industry stakeholders. The is main reason for this study is to examine the gaps that exist for sustainable management of the industry and in view of the following:

- The oil palm industry has been accused by NGOs of causing major deforestation in South-east Asia, thus reducing world tropical biodiversity and the killing of Orang Utan, the iconic species that has its habitat in the tropical rainforest.

Conservation efforts that have been undertaken to date are of token value and have no real impact ("green washing") and the Roundtable for Sustainable Palm Oil (RSPO) has failed to rectify this situation, clearly described in Butler, R. A., and Laurance, W. F. (2009 and Basiron, Y. (2011).

- The lack of sufficient data and acceptable sustainability measurement in this sector perpetuates the lack of informed decision-making for the advancement of sustainable agriculture. This was identified by the Roundtable for Sustainable Palm Oil in their Principle and Criteria for the need transparency in data management (RSPO, (2010, April 7)).

- The shifting goal post for sustainability requirements for the oil palm growers creates unwarranted production constraints on the industry. These ever changing requirements were deliberated extensively by Malaysian Palm Oil Council, (Basiron, Y. (2011)).

- The negative perceptions of NGOs from outside Malaysia and pressure from them, asking for the industry to change or even cease operations need to be rectified and mitigated. This is especially true with regards to Greenpeace and WWF International. (Greenpeace, (2010, April, 7) and RSPO (2010, April 7)).

1.6 Research Questions

The questions that form the basis of this study include:

1. Can oil palm plantations in Malaysia be made sustainable?

   ❑ Is the oil palm sustainability debate driven by perception?

   ❑ Does perception play a major role is sustainable criteria setting?

2. How does productivity relate to sustainability?

❑ Can we measure sustainable growth?

❑ What are the major variables in these three sectors (environment, social and economy)?

Importance of Variables: The variables were evaluated according to the following considerations: Environmental variables: Minimum Environmental impact, Social variables: Maximum yield (fresh fruit bunch) with minimum energy input and Economic variables: Best price for fresh fruit bunch and crude palm oil. And the list of variable are depicted in the World Bank Metadata (Appendix 2).

3. How do we incorporate social, economic and environmental values into sustainable practices in the industry?

❑ Can all the values from the social, economic and environmental variables of sustainable agriculture be used by all decision makers to get the best output from their land management practices within their industry?

1.7 Objectives of the study

The main objectives for this study are:

1. To *review the framework* of palm oil sustainability and apply it to the development of oil palm plantations;

2. To *review the perception trends* with regards to oil palm plantation development and consider their implications;

3. To *analyse and relate the* (economic, social and environmental) *variables* that are important for palm oil production practices; and

4. To *derive the key variables* for establishing the measurement of sustainable land resource management in the oil palm sector.

1.8 Significance of the Study and its Contribution.

This study will help the industry progress sustainably and its significance lies in providing the following:

a. Theoretical Contribution:

By linking economic theories and sustainability science through resource management, it provides a theoretical framework to support the establishment of the palm oil industry.

b. *Perception Management:*

If sustainability principles are driven by perception in Malaysia, this study provides a means of measuring such perceptions, addressing the gaps in these perceptions and using data to manage current perceptions towards the industry.

c. Policy Contribution:

"Real value" management issues can be made apparent by stakeholder surveys and palm oil variable analysis. These issues can then be recognized for planning purposes via statistical tests for the important palm oil industry variables.

d. Empirical Contribution:

Variables of economic importance for palm production in Malaysia are prioritized, and based on this prioritization, each sustainability criterion can be given the appropriate weight for management purposes.

1.9 Organisation of the Study

The study consists of seven chapters, including three analytical chapters that will cover: the overall analysis and review of the literature; results and analysis of the stakeholder perception survey; and results and analysis of the statistical analysis carried out on the variables (secondary data) collected for the study.

This thesis is organised as follows:

Chapter 1: Introduction

It described the back ground, stating clearly the importance of palm oil as the leading export earner among the primary commodities that gave a revenue of RM$80.4 billion in 2011 and accounts for 11% of export earnings for Malaysia. It also employs 600,000 people and help developed rural townships and has successful Felda Global & Sime Darby ventures listing, export of planting services worldwide (*MPOC, 2012).*

This chapter also defined the sustainability of palm oil as the Brundland Definition "Sustainable development is development that *meets the needs of the present* without *compromising the ability of future generations* to meet their own needs" (WCED 1987, 43). And venture in the problem of the study: The Oil Palm plantations are deemed unsustainable by NGOs and many importing nations, even though the Malaysian growers act according to a sustainability code of conduct determined by Malaysian

authorities. Therefore: gaps exist with regards to determinates for sustainable management amongst the industry stakeholders.

Chapter 2: Literature Review

A compilation of more than 171 articles were sourced for this review and some of the latest publications, the current situation in the palm oil market and its efforts to meet sustainability criteria were discussed. The review was carried out thematically, and the first task was to group the articles into categories, so as to arrive at a clear synthesis of the current state of sustainability. The thematic synthesis is listed below: The Environment and the Oil Palm Industry, Agricultural Management and Requirements, The Sustainability of Palm Oil and Its Products, Palm Oil as a Biofuel and Biodiesel, Managing the Greenhouse Gases from the Palm Oil Industry, The Palm Oil Industry and The Carbon Market, Food, Fats and Oils, Social Well Being and The Economy and Perception, a New Management Tool

The gaps in the literature review was laid out: The Difference/Gaps between the Sectors: It was found the scientists and experts vary in the opinion in matters with regards to palm oil, depending where their main focus of interest is. This is especially true for work done in the tropics compared to other hemisphere. Scientific Tools and International Standards*: Incongruent standards can be barriers to trade. Scientific tools and Standards require clear identifiable references, acceptable to tropical agricultural practices. Lack of Data for Sustainability Challenges: The lack of data to support sustainability is apparent. There has been a perpetual need to meet the challenges faced by growers and producers. Varying Perceptions: Perception has been an instrumental tool in the setting of sustainability principles & criteria. Scientific measurement or economic empirical values have are arbitrary in sustainable management. Empirical

Values For Sustainability Measurement: There is yet a sustainability index or other empirical measurements in setting sustainability requirements .

Chapter 3: Research Methodology

Set up of Theoretical Framework: In *Figure 3.1*: a visual map is presented to show how the conceptual framework relates to the oil palm industry. It depicts how the management of oil palm plantations connects the Neo-Malthusian Theory, which is most relevant to palm oil production, to the stakeholder groups and the economic, environmental and social rationales for the current state of the oil palm industry. This helps to clarify how the sustainable production of palm oil is linked to the growth of oil palm plantations, with the Neo-Malthusian Theory as the basis for the increasing production of palm oil. Set up of Conceptual Framework: There are two elements of interest in relation to the sustainable production of palm oil. The first is the requirement that palm oil production is sustainably managed and the second is the ever-changing demands in terms of sustainability criteria that are imposed on palm oil producers. For good governance to prevail in sustainable palm oil production, it is crucial to manage the following: product demand, stakeholder perceptions of sustainability and the variables or determinants for sustainable management of palm oil production. *Figures 3.2* shows the graphic connections among all the elements identified.

Perception survey, covering oil palm producing, processing firms: the main stakeholders in Malaysia was conducted since March 2011. Respondents: *Number of Survey*: *742 respondents* (top and middle management) United Plantations Bhd, Hap Seng Consolidated Berhad, Kulim Malaysia Berhad and IOI Group Malaysia. Focus group meetings, at Industry conferences in the years 2010, 2011 and 2012.

Secondary Data Analysis: There were a list of 120 variables for agriculture and palm oil industry from the following sources: Malaysian Palm Oil Board (2002-2011), World Bank (2012), Njoo (2001), Asari et al. (2011) and International Monetary Funds (2012). Malaysian Palm Oil Council, Malaysian Palm Oil Board, Department of Statistic, Malaysia, World Bank Databank, International Monetary Funds Data, etc. Dependent Variable: Palm Oil Price; Total Oil Palm Planted Area (Selected from survey). Independent Variable (Data Source):

Chapter 4: Analysis & Findings: The Perception Survey Analysis and Results

For the grower and trader/manufactures stakeholder groups: economic issues ranked most important, followed by environment. While for the Media and NGOs: Environment was most important followed by economy, reflects to a large extent the views of traders/manufacturers and growers concerning environmental awareness about the palm oil industry. In comparison, therefore, it reflects to a lesser extent the views of NGOs and the media concerning these issues. Most of the traders/manufacturers as well as the growers agreed with all the statements put to them in the questionnaire.

Chapter 5: Analysis & Findings: Oil Palm Variable Analysis and Results

The value of non-recurrent costs had kept in pace with the increase in production, but these values are only available from 2002 to 2010. This cost describes the finances that are non-recurrent to set up the oil palm plantations. The upkeep and cultivation cost for Malaysia also climbed but less severely, and tapered off by 2009 as well. It can be theorised that as the growers acquire more experience in their work, they become more cost effective in the management of the plantations. Therefore, we can safely deduce that the planted area for oil palm was not coming from the conversion of the Malaysian rainforest but from the conversion of other agricultural land or industrial zones. The

agricultural methane emissions (% of total) and agricultural nitrous oxide emissions (% of total) data shows no obvious connection to agricultural progress, but this not a clear indication of lack of connection among them, as both these variables were new measurements and there was insufficient data for analysis.

Chapter 6: Analysis & Findings: Statistical Prioritisation of Oil Palm VariablesFor Production

Not all the variables identified could be used to run the regression and correlation test as the data records/fields requirements were not met, as the data sets were not complete for statistical analysis. These variables were tested for significance against the palm oil price and total planted area in Malaysia, to show if they have any impact and could change the production patterns. The final selection of variables for testing is listed in *Table 6.1.* Statistical Findings: Most Important variables - Harvested Area, Fresh Fruit Bunch Total, Local CPO Delivery Price , No of Workers

Chapter 7: Conclusion and Recommendations

The perception issues are linked with the lack of measurable variables for sustainability: Those variables considered not important previously, The perception issues and history of the industry are the key determinants now for oil palm's lack of sustainability, and There are obvious gap between what the industry perceives important and the International media perception

Two dependent variables were selected as dependent variables: palm oil price per year and total planted area for oil palm in Malaysia (deforested area) were selected from the perception survey and analysis; Most Important variables: Harvested Area, Local CPO Delivery Price , No of Workers and Total Fresh Fruit Bunch