

**THE TIMELINE OF FOREST MANAGEMENT IN  
MALAYSIA TOWARDS ACHIEVING  
SUSTAINABLE DEVELOPMENT GOALS**

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TOWARDS ACHIEVING SUSTAINABLE  
DEVELOPMENT GOALS**

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## ORIGINAL LITERARY WORK DECLARATION

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GOALS

Field of Study: Environmental Management

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## ABSTRACT

Malaysia is committed to sustainable forest management (SFM) and this is reflected in the progress made on forest matters since UNCED. The National Forestry Policy was adopted in 1978 and revised in 1992, while the amendments of the National Forestry Act 1984 (amended in 1993) accorded greater emphasis on environmental protection and conservation of biological diversity. This dissertation presents a timeline approach in examining the relationships between forest resource development, forest degradation issues, and Malaysia's efforts toward achieving sustainable development. The aim of the study was to examine from a timeline perspective how Malaysia's growth trajectory, as determined by the utilisation of forest resources, had led to not only growth and expansion of its economic base as a common feature of development, but also the emergence of forest degradation issues. Four research objectives were established to answer the research questions in this study. The first objective was an examination into forest resources development in Malaysia, while the second objective was identification of forest management strategies undertaken by Malaysia. The third objective was to evaluate the effectiveness of the existing forest management strategies and the final objective was to identify the challenges in forest management related to forest resource development. To answer these objectives, data were collected from primary and secondary sources, where qualitative analysis was used to analyse the primary data and document analysis was adopted to analyse secondary data. The findings showed that the consumption of forest resource in Malaysia and the size of forest areas changes through time. In depth interviews with 10 respondents from different cohorts revealed the same opinion, which was that Malaysia cannot achieve sustainable development by 2020 if no alternative action is taken. The Strength, Weaknesses, Opportunity, and Constraint (SWOC) analysis was employed to determine various aspects relating to forest management in Malaysia. The last two decades also witnessed the increasing impact of trans-boundary problems in

Malaysia that include both regional and global issues. These trans-boundary issues create another dimension that needs to be addressed in forest management, since at the national level, forest management faces tremendous challenges that need to be overcome. Trans-boundary issues are difficult to manage because it affects many countries that have different priorities in their development of forest resources. Malaysia's approach toward forest management is basically a three-pronged strategy that deals with management at the National, Regional, and Global levels.

## ABSTRAK

Malaysia adalah komited dalam usaha berkaitan pengurusan hutan mapan (SFM). Hal ini dapat dilihat dalam kemajuan yang dijalankan berkaitan perkara-perkara yang melibatkan isu perhutanan semenjak dilancarkan oleh UNCED. Dasar Perhutanan Negara telah diterima pakai pada tahun 1978 dan telah disemak semula pada tahun 1992, manakala Akta Perhutanan Negara 1984 (Pindaan 1993) telah diberi penekanan yang lebih kepada perlindungan alam sekitar dan pemuliharaan kepelbagaian biologi. Tesis ini menerangkan tentang penggunaan pendekatan garis masa untuk mengkaji hubungan antara pembangunan sumber hutan, isu-isu kemusnahan hutan dan usaha Malaysia ke arah mencapai pembangunan mapan. Tujuan kajian ini adalah untuk mengkaji dalam perspektif garis masa bagaimana trajektori pertumbuhan di Malaysia sebagaimana yang telah ditentukan oleh penggunaan sumber hutan yang telah membawa kepada bukan sahaja pertumbuhan dan perkembangan asas ekonomi terhadap perkara biasa dalam pembangunan, tetapi kemunculan isu-isu degradasi perhutanan. Empat objektif kajian dinyatakan di dalam tesis ini untuk menjawab persoalan di dalam kajian ini. Objektif utama adalah mengkaji sumber pembangunan hutan di Malaysia. Kemudian, objektif kedua adalah untuk mengenalpasti strategi pengurusan hutan yang dilaksanakan oleh kerajaan Malaysia. Objektif seterusnya, untuk menilai keberkesanan strategi pengurusan hutan yang sedia ada dan objektif yang terakhir adalah untuk mengenal pasti cabaran dalam pengurusan hutan yang berkaitan dengan pembangunan sumber hutan. Untuk menjawab objektif-objektif kajian ini, pengumpulan data yang dilaksanakan adalah dari sumber data primer dan data sekunder. Setiap data yang diperolehi telah dianalisis menggunakan analisis dokumen dan analisis kualitatif. Untuk data primer, analisis kualitatif digunakan dalam penganalisan data manakala untuk data sekunder analisis dokumen digunakan dalam penganalisan data. Dapatan kajian telah menunjukkan

tentang pembangunan sumber hutan di Malaysia dari segi penggunaannya serta bilangan dan perubahan kawasan hutan di Malaysia. Temuramah secara mendalam telah dilakukan ke atas sepuluh orang responden yang terdiri dari kohort yang berbeza. Hasil kajian juga telah menunjukkan bahawa setiap responden yang ditemubual menyatakan pendapat yang sama iaitu Malaysia masih tidak boleh untuk mencapai pembangunan yang mapan menjelang tahun 2020. Analisis berkaitan Kekuatan, Kelemahan, Peluang dan Kekangan iaitu analisis SWOC juga telah digunakan untuk menentukan pelbagai aspek berkaitan dengan pengurusan hutan di Malaysia. Dua dekad yang lalu juga telah menyaksikan kesan peningkatan masalah yang melibatkan alam sekitar merentasi sempadan di Malaysia yang merangkumi kedua-dua isu-isu serantau dan global. Isu-isu ini merentasi sempadan dan telah mencipta satu lagi dimensi dalam pengurusan hutan di peringkat kebangsaan serta menimbulkan cabaran besar yang perlu diatasi. Isu-isu merentasi sempadan sukar untuk diuruskan kerana ia memberi kesan kepada banyak negara-negara yang mempunyai keutamaan yang berbeza dalam pembangunan sumber perhutanan mereka. Usaha Malaysia ke arah pengurusan hutan pada dasarnya adalah dalam strategi tiga serampang yang berkaitan dengan pengurusan di peringkat Kebangsaan, Wilayah dan Global.

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## LIST OF ABBREVIATIONS

CRIF	Commercial Regeneration Improvement Felling
CES	Compendium of Environment Statistics
CBD	Convention on Biological Diversity
DOE	Department of Environment
DOS	Department of Statistics
DRIF	Departmental Regeneration Improvement Felling
EPU	Economic Planning Unit
EDI	Environmental Degradation Issue
EIA	Environmental Impact Assessment
EMS	Environmental Management Systems
EQA	Environmental Quality Act
ERD	Environmental Resource Development
GEMI	Global Environmental Management Initiative
GDP	Gross Domestic Product
GNI	Gross National Income
IAPG	Inter-Agency Planning Group
IACES	Inter-Agency Committee on Environment Statistics
ICPD	International Conference on Population and Development
MUS	Malayan Uniform System
MDGs	Millennium Development Goals
NDP	National Development Policy
NEP	National Economic Policy
NFP	National Forestry Policy
NIH	National Institutes of Health
NLC	National Land Council
NPA	National Plan of Action on Population and Development
NPFDB	National Population and Family Development Board
UKM	National University of Malaysia
NVP	National Vision Policy
NGOs	Non-governmental Organisations
UUM	Northern University of Malaysia
PRFs	Permanent Reserved Forests
POA	Programme of Action
RIF	Regeneration Improving Felling
SWOC	Strengths, Weaknesses, Opportunities, and Constraints
SFM	Sustainable Forest Management
UNDP	United Nation Development Plan
UN	United Nation
UM	University of Malaya
UPM	University Putra Malaysia

## **CHAPTER 1: INTRODUCTION**

### **1.1 Introduction**

Malaysia, as a developing country with established environmental-related laws, provides sufficient basis for the government authorities to launch numerous programmes relating to the preservation and protection of the environment from threats of pollution, environmental degradation, and over-exploitation of natural resources. Forest resources development in Malaysia is one mechanism of income generating economic activities. The early effects on the forest development were from tin mining and agricultural activities. Tin mining activities scarred the landscape and left the land idle, subject to surface erosion. Some of the ex-mining lands are now being rehabilitated through agriculture and animal husbandry, aquaculture in old mine ponds, housing and factory construction, recreation centres, and as a source of raw materials for the manufacture of construction materials. Recognising that development brought with it changes to the environment and these had to be regulated, the Malaysian government passed the Environmental Quality Act (EQA) 1974 to enable a comprehensive approach to be taken in order to address environmental issues, and established the Department of Environment in 1975 as an agency of the Ministry of Science and Technology (INTAN, 1994). The evolution of forest development occurred in different stages which focused from the development planning onwards. The development wave in Malaysia highlights that Malaysia is really concerned about economic activity; nevertheless these efforts are parallel with the attempt to ensure that the surroundings also command attention in order to get balanced development without greatly harming the environment.

The forests of Malaysia have been systematically managed with the establishment of the Forestry Department in 1901, whereby ecologically and environmentally sound forest conservation and management practices have been

developed to ensure forest renewal and sustained yield. In the early 1920s, forest management by Departmental Regeneration Improvement Felling (DRIF) was aimed solely at improving the existing stock through removal of inferior species (Wyatt-Smith and Panton, 1995). However, with rising demand for firewood and poles from the mining industries in the 1930s, Commercial Regeneration Improvement Felling (CRIF) was introduced. A few years after the Pacific War, Regeneration Improving Felling (RIF) was discontinued because of the increased demand for raw materials. This led to the formulation of the Malayan Uniform System (MUS) in 1948, which consists of removing the mature crop in one single felling of all trees down 45cm dbh for all species. The evolution of forest management studies was documented with the chronological of attempts by Malaysia toward achieving the aim to become a developed country. Forest resources development is one of the terms used in forest development planning and forest development resource. Similarly, it always involves the effects and impact toward the surroundings, especially regarding human life. Economic development is more stressed on the circle of life. Even though Malaysia aims toward becoming a developed country, at the same time, the most important concern is about the quality of life while achieving better economic status levels. Forest is one of the environmental resource always becomes an important factor in formulating new strategies in any development plan. Main component in the environment, namely water, air, land, and ecology as a part of forest would rely on between each other. There are many studies related to the impact and effects on the environment when projects focusing on development are performed. From the beginning until the end of the project, the situation would become problematic if they do not obey the rules and regulations as established by the authorities. This study shall define environmental forest resources development and the forest management in the Malaysian context for assisting the nation in achieving the target of maintaining sustainable development for

the country.

## **1.2 Problem Statement**

Malaysia as a developing country needs resources to initiate and sustain its developmental activities. Forest resources constitute a major component in the country's development as it provides the supply of raw materials which provides the basic resource that propagates many types of economic activities, including agriculture, mining, lumbering, energy, and tourism. Economic development affects the process-response regimes of the environment and three overarching characteristics could be observed, which includes an increase or decrease in the frequencies and intensities of processes, the creation of new processes, and the derivation of wastes. The timeline analysis in this study would show the challenges Malaysia faced and would face in the future as it realises Vision 2020, which is to become not only a developed and industrialised nation, but a nation with a populace that would not be threatened by forest degradation issues as that propagated by the Rio Declaration 1992 declaration of sustainable development. The timeline analysis also would be able to identify the strengths, weaknesses, opportunities, and constraints that Malaysia has as of today, and how better for it to position itself to address present and future challenges. These overarching characteristics of forest changed are called forest degradation and are associated with a change in environmental quality and thus affect human quality of life. Environmental quality can be determined by measuring the change in environmental quality parameters that usually characterises the major forest subsystems of air, water, land, and ecology. Malaysia's development progression shows clear evidences that the country had positioned itself toward achieving and realising to become a developed and industrialised nation by the year 2020. However, the last decade or so showed that Malaysia continues to be threatened by increasing diversities, frequencies, and

intensities of forest degradation, and their threat on human quality of life issues. The strategies for forest and implementation have been gradually implemented at the national level, and lately at the regional and global scales. This study would be able to show the relationship between forest development, forest degradation, and management efforts of forest development undertaken by Malaysia through the lens of timeline analysis which would give an account of the effort Malaysia has taken to address forest degradation and its impact on human quality of life at the national, regional, and global scales.

### **1.3 Aim**

This study investigated the relationships between forest resources development, forest degradation issues, and forest management efforts undertaken by Malaysia towards achieving a developed nation status that adheres to the needs of sustainable development as propagated by the Rio Declaration 1992 in Rio de Janeiro. This study adopted a timeline approach where the development timeline describes the relationships between forest resources development, forest degradation, and forest management efforts undertaken by Malaysia. The study hopes that this trend change in the relationships between development, degradation, and management would provide insights whether Malaysia is idealising the needs for sustainable development as it progresses toward achieving a developed industrialised country status as envisioned in its Vision 2020 targets and of the issues and challenges that need to be overcome in order to become a developed country that abides by the call for sustainable development.

#### **1.4 Research Objectives**

The research objectives in this research include the followings:

- 1) To examine forest resources development in Malaysia.
- 2) To identify forest management strategies undertaken by Malaysia.
- 3) To evaluate the effectiveness of the existing forest management strategies.
- 4) To identify the challenges in forest management related to forest resources development.

#### **1.5 Scope of Research**

The scope of research would be bounded by the research objectives and the time period of forest resources development, forest degradation issues, environmental effects, environmental impacts and also forest management in Malaysia. The timeline is built up by environmental resources development of forest in Malaysia. Forest degradation issues which are discussed on the timeline are based on the data gathered, which do not cover the entire aspects of the environment. Some of the data might not fulfil the scope of study due the obstacles in the data collection stage.

#### **1.6 Data Acquisition, Analysis, and Results**

This research obtained with two sources of data, namely primary and secondary data, which are summarised in the data acquisition and data analysis processes for this particular study. The explanation contains research objectives, research questions, data sources, data extraction, data acquisition, data analysis, and presentation of results. The in depth explanation of the research method is provided in Chapter III of this dissertation.

## **1.7 Study Region – Malaysia as a Developing Country**

Since the Independence in 1957, Malaysia has embarked on a progressive path to improve the social and economic standing of the country and its citizenry, by steadily developing high rates of economic growth combined with significant reduction in poverty and unemployment levels, as well as addressing other socio-economic imbalances. The force behind these early achievements were laid out under the nation's comprehensive Outline Perspective Plans, which included detailed Five-year Malaysia Plans and strategic policy initiatives that sought to eradicate poverty, restructure society, sustain growth, and maintain national unity.

The Malaysian economy has undergone rapid transformation since the Independence in 1957. At the time of Independence, the economy was precariously dependent on two primary commodities, namely rubber and tin, and the prices of which were highly volatile. Consequently, the economy was very vulnerable to fluctuations in primary exports. Export diversification was one of the first measures taken after the Independence. Palm oil, pepper, cocoa, and pineapple were among the new commercial crops geared primarily for the export market. Manufacturing was introduced for purposes of import substitution under mild tariff protection. Malaysia has experienced phenomenal economic growth in the last two decades. It has undergone a major structural transformation, moving from an agricultural-based to manufacturing-based economy with significant social changes. This rapid development has brought about significant impacts to the natural environments.

Malaysia was chosen as the subject of interest in this research because it is described as one of the fastest growing developing countries in Southeast Asia, East Asia, and the world. As a rapidly developing country, Malaysia needs resources, especially environmental resources. Development of environmental resources has led to rapid enhancements of its economy manifesting as the positive changes in the cultural

landscape of the country. However, environmental resources development has its negative effects and impacts, and this provides the challenge for Malaysia to establish sustainable development programmes at the national and international spatial scales. Forests have played an important role in the resource based socio- economic development of Malaysia. In accordance with Malaysia's Federal Constitution, the legislative control of land and forests is a state matter and the state governments have complete jurisdiction over their respective forest resources.

Malaysia enacted two landmark legislative initiatives to protect and maintain the environment. The first deed was the passing of the Environmental Quality Act 1974 that marked the beginning of the government's commitment to preventing pollution and degradation of natural resources. In order to ensure that environmental planning became part of development projects, the Environmental Impact Assessment was later amended to the EQA to become a valuable tool to safeguard resources and ameliorate the negative consequences of development. The National Development Policy of the Second Outline Perspective Plan (1991-2000) categorically stated "adequate attention will be given to the protection of the environment and ecology so as to maintain the long term sustainability of the country development". Also outlined in the First Statement in Malaysia 2020, invaluable natural resources should not be wasted. To ensure effective forest management and the implementation of the National Forestry Policy in Malaysia, various forestry enactments and ordinances were formulated and enforced by the respective state authorities since the early 1900s that other legislation which are considered of major importance to the forestry sector apart from the National Forestry Act, 1984 (Amendment 1993). The National Forestry Policy 1978 and The National Forestry Act 1984 are currently being reviewed to incorporate the new emerging issues forestry such as strengthening forest governance, enforcement activities, climate change, habitat loss and food security.

The National Forestry Programmes are holistically planned and implemented to enhance forest management practices, sustain forest health and eco-system services. The programmes look into the following aspects; forest resources management, environmental protection and socio-economic benefits from the forest to achieve sustainable forest management (SFM). In addition to this, the land-use policy based on forest types is also being reviewed. Malaysia Government through the Department of Environment has formulated its vision, that is, to contribute towards nation building in attaining a better level of health, safety, and quality of life through conservation and preservation efforts, prevention and control of pollution, and protection and promotion of wise use of natural resources toward sustainable development for present and future generations.

## **1.8 Thesis Structure and Content**

This dissertation is written in seven chapters. The outline is as follows.

### **Chapter 1 – Introduction**

The details of the introduction are where the researcher had to consider while conducting this research. It introduces the reader to the aims and objectives of the research and the research methodology. It provides some basis for consideration on the manner of conducting this research. It details some of the contribution this research may provide by utilising its research findings and uncovered information.

### **Chapter 2 – Literature Review**

Chapter 2 discusses the literature review in greater depth. This chapter provides information about the research performed by other researchers by focusing on the studies about development, forest resources, and forest management in Malaysia.

Moreover, this chapter also describes the attempts by Malaysia to achieve a sustainable development nation status.

### **Chapter 3 - Data Acquisition and Analysis**

Chapter 3 discloses the data acquisition and analysis processes in more details. The described method explains how to achieve the research objectives and the techniques to solve the research questions wisely. The chosen methodology was based on the literature review and appropriateness of research objectives as well.

### **Chapter 4 - Malaysia as a Developing country**

Chapter 4 contains a description related to the study about Malaysia as a developing country. This chapter explains more about Malaysia as the selected region of study. Also described are details from the historical aspect that focus on forest management in Malaysia.

### **Chapter 5 - Results and Interpretation**

Chapter 5 presents the results and interpretation deriving from government reports, articles, past research, and the interview conducted in this study area. The results are presented in the form of timetables and in-depth explanation as a product of the research analyses.

### **Chapter 6 - Discussions**

Chapter 6 explains in depth the discussion entirely about the whole research. In this chapter, the explanation also includes a SWOC analysis which refers to Strengths, Weaknesses, Opportunities, and Constraints. The preliminary conclusion of this study is

also included in this chapter. The recommendations and suggestions to enhance the quality of management in environmental aspects are also listed in this chapter.

## **Chapter 7 – Conclusion**

This chapter is the conclusion of all the theses contained in this dissertation as part of the research study. The conclusion part will cover all the theses discussions with simple and clear descriptions. The suggestions and knowledge contribution of this study are formalised in this chapter as well.

### **1.9 Summary of Chapter**

Chapter I has introduced the gist of this dissertation. The explanation of each section shows contents of all chapters. Each chapter explains in greater depth based on the categorisation and arrangement of topics. This chapter also focused on the surface of the research to present an idea about the aim of this study. For every point, the information provides directions of the entire path to answer the research questions and to achieve the research objectives for this study

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This study investigated the evolution of forest resource development and management in Malaysia toward achieving sustainable development goals. To cater to the problem statement of this research, many articles concerning these particular issues must be identified. These readings not only focus on the research performed by previous researchers, it also involved reading broad materials that discuss the current issues. Identifying reading materials was important to collect pertinent and relevant information proved by previous research. The identified books and articles are not limited to certain fields of study, but cover a variety of fields including environmental management, forest management, environmental economics, environmental sciences, environmental engineering, sustainable development, environmental management methodology, globalisation issues, and philosophy of the environment, as well as issues related to developing countries. The keywords used in these studies are environmental management, environmental resource development, forest resource development, forest degradation issues and sustainable forest management. These five of keywords are generally important to answer all the research questions stated in Chapter I. The combinations of each keyword will guide the researcher to find the conclusive results of this research.

### **2.2 Environmental Management**

Generally, human systems need resources to evolve. Environmental characteristics such land, soil, hydrology, climate, and the whole rubric of flora and fauna have values that can be translated into resources. The rapid growth of population

during the 20th century has increased pressure for more land made available for agriculture, resource exploitation such as quarrying, mining, and forestry, and for city expansion to cope with the increasing population and urbanisation (Derbishyre & Owen, 1997). Environmental resource development could also characterise the Gross Domestic Product (GDP) of a country. The higher the GDP the more intense the development of a country's environmental resource base. For instance, one of the fundamental drivers for evolution of the European energy system is future activity growth, which is characterised by strong uncertainty in the aftermath of persisting slowdown of GDP growth in the EU, due to the recent economic and debt crises. Alternative growth projections would have significant implications on the projected EU energy demand and supply, and the associated GHG emissions, as higher GDP would directly lead to higher energy demand and thus to increased emissions. According previous researchers (Ec, 2011; Kriegler et al., 2013), this increase can be moderated, as higher economic growth allows for faster capital turnover so that higher amounts of energy efficient equipment enter the capital stock sooner, and thus the overall energy intensity of GDP would decline. Moreover, it has been proven that investment in low and zero carbon technologies as well as in energy efficient techniques can be stimulated by high economic growth (De Cian et al., 2013). This would lead to the reduction of energy intensity for every unit of economic activity (Capros et al., 2015). Meanwhile in developing countries, Kandil (2015) showed that the variability of the exchange rate is less pronounced, thus reflecting a more stabilised exchange rate system, as compared to the more advanced countries.

Naturally, humans need air for breathing for the duration of his or her whole life (Inglis, 2008). Man's relations to his environment are infinitely more numerous and complex than those of the most highly organised plant or animal. So complex are they that they constitute a legitimate and necessary object of special study. The investigation

which they receive in anthropology, ethnology, sociology, and history is piecemeal and partial, limited as to the race, cultural development, epoch, country, or variety of geographic conditions taken into account. Meanwhile, history undertakes to explain the causes of events, but fail to reach a satisfactory solution of problems, largely because of the geographic factors which enter them all that have not been thoroughly analysed. Man has been so noisy about the way he has “conquered Nature”, and Nature has been so silent in her persistent influence over man, where the geographic factor in the equation of human development has been overlooked (Churchill, 2005).

Human progress has always depended on technical ingenuity and a capacity for cooperative action. These qualities have often been used constructively to achieve development and environmental progress; in air and water pollution control, for example, and in increasing the efficiency of material and energy use. Many countries have increased food production and reduced population growth rates. Some technological advances, particularly in medicine, had been widely shared (United Nation, n.d.). Components of the environment are divided into four, namely air, water, land, and ecology (Infrastructures, Information, Planning, & Management, n.d.). Each of these components is needed for humans to continue living their normal lives. Without dealing with one component, it would thus disturb the process of getting a comfortable life (Moran & Brond, 2013). Environmental components react with each other to supply valuable resources for humans and the surroundings. The environment contains a variety of resources, such as land, water, minerals, petroleum, forest, marine resources, tin, and many more other resources. These are links to the environment and resources, where there are relations between them. Every clan, tribe, state, or nation includes two ideas, a people and its land, where the first is unthinkable without the other (Churchill, 2005).

In a study done by Churchill (2005), it was stated that history, sociology, and ethnology only cover the inhabited areas of the Earth. These areas gain their final significance because of the people who occupy them; their local conditions of climate, soil, natural resources, physical features, and geographic situation are important primarily as factors in the development of actual or possible inhabitants. A land is fully comprehended only when studied in the light of its influence upon its people, and a people cannot be understood apart from the field of its activities. More than this, human activities are fully intelligible only in relation to the various geographic conditions which have stimulated them in different parts of the world. The principles of the evolution of navigation, agriculture, and trade, as well as the theory of population, can never reach their correct and final statement, unless the data for conclusions are drawn from every part of the world, and each fact interpreted in the light of the local conditions whence it sprang from. There are specific links between economic growth, natural resources, human development, and even globalisation where institutional quality and schooling are specific dimensions of the wider concept of human development approach (Costantini & Monni, 2007).

An environmental resource is not able to stand on its own without exploration to generate resources for humans and other wildlife to continue with their lives. Generally, the human era is different according to civilisation (Kerry, 2007). Environmental stress has often been seen as the result of growing demand on scarce resources and pollution generated by the rising living standards of the relatively affluent. However, poverty itself pollutes the environment, creating environmental stress in a different way. Those who are poor and hungry will often destroy their immediate environment in order to survive. They will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities.

The cumulative effect of these changes is so far-reaching as to make poverty itself a major global scourge (United Nation, n.d.).

Developing countries are different from developed countries in terms of development. Many developing countries in the world have explored their resources to generate income for their countries. They need to carry out the exploration of resources to fulfil their needs for achieving comfortable living. The exploration of resources for the aim of development would create environmental issues. A report by WCED (1987) revealed that in recent years, industrial countries have been able to achieve economic growth using less energy and raw materials per unit of output. This, along with the efforts to reduce the emission of pollutants, will help to contain the pressure on the biosphere. However, with the increase in population and rise in income, per capita consumption of energy and prices of materials going up in the developing countries are essential for the needs to be met. Greater attention to resource efficiency can moderate the increase, but, on balance, environmental problems linked to resource use will intensify in global terms (Esty & Ivanova, 2003). As mentioned by Sheraz (2014), natural resources can contribute significantly to development in different ways, by generating an economic activity and as a source of growth; and as a livelihood, by providing much-needed jobs for people thereby reducing poverty and supporting the achievement of Millennium Development Goals (MDGs).

The problems of environmental issues normally would occur when the development activities begin (Kamble, 2013). Any development activities related to land exploration would change the landforms and somehow create degradation issues such as slope failure, soil erosion, and floods as well. On the other hand, a report by United Nation (n.d.) pointed out that even though economic growth has led to improvements in living standards, it has sometimes been achieved in ways that are globally damaging in the long term. Much of the improvement in the past has been

based on the use of increasing amounts of raw materials, energy, chemicals, and synthetics, and on the creation of pollution that is not adequately accounted for in figuring the costs of production processes. These trends have had unforeseen effects on the environment. Thus today's environmental challenges arise both from the lack of development and from the unintended consequences of some forms of economic growth (Goldstein, 2002). For example, the consequences of polluted water, land, and soils are most visible in deteriorating health, lost agricultural productivity, and damaged ecosystems of the mine surroundings (Sheraz, 2014).

Environmental degradation issues (EDIs) and forest degradation issues usually occur due to development activities. Higher exploration would lead to negative impacts and effects toward surroundings. According to Churchill (2005), the history and culture of a people embody the effects of previous habitats and of their final environment; but this means something more than local geographic conditions. It involves influences emanating from far beyond the borders. No country, no continent, no sea, mountain, or river is restricted to itself in the influence which it either exercises or receives. Furthermore, the impacts and effects caused by EDI could affect quality of life as well. These statements are supported by Churchill (2005). Four fundamental classes of effects can be distinguished, namely the first class, which includes direct physical effects of the environment, similar to those exerted on plants and animals by their habitat. Certain geographic conditions, more conspicuously those of climate types, apply certain stimuli to which man, like the lower animals, responds by an adaptation of his organism to his environment. Many physiological peculiarities of man are due to physical effects of the environment, which doubtless operates very strongly in the earliest stages of human development, and in those shadowy ages contributed to the differentiation of races. The unity of the human species is as clearly established as the diversity of races and peoples, whose divergences must be interpreted chiefly as modifications in response to various

habitats in extended periods of time. The second one more varied and important, are the psychological effects of geographic environment. As direct effects, they are doubtless bound up in many physiological modifications; and as influences of climate, they help differentiate peoples and races from the context of temperament.

Next, the third geographic condition type influences the economic and social development of a people by the abundance, paucity, or general character of the natural resources, by the local ease or difficulty of securing the necessities of life, and by the possibility of industry and commerce afforded by the environment. From the standpoint of production and exchange, these influences are primarily the subject matter of economic and commercial geography; but since they also permeate national life, determine, or modify its social structure, condemn it to the dwarfing effects of national poverty, or open to it the cultural and political possibilities resident in national wealth, they are legitimate material also for anthropic-geography.

Meanwhile, the fourth and final class belongs exclusively to the domain of geography, because it embraces the influence of the features of the Earth's surface in directing the movements and ultimate distribution of mankind. It includes the effect of natural barriers, like mountains, deserts, swamps, and seas, in obstructing or deflecting the course of migrating people and in giving direction to national expansion; it considers the tendency of river valleys and treeless plains to facilitate such movements, the power of rivers, lakes, bays, and oceans either to block the path or open a highway accordingly, since navigation is in a primitive or advanced stage; and finally the influence of all these natural features in determining the territory which a people is likely to occupy, and the boundaries which shall separate them from their neighbours. Additionally, the United Nation reports pointed out that the scale and complexity of requirements for natural resources have increased greatly with the rising levels of population and production. Nature is bountiful, but it is also fragile and finely balanced.

There are thresholds that cannot be crossed without endangering the basic integrity of the system. The situation today is so close to many of these thresholds, thus humans must be ever mindful of the risk of endangering the survival of life on Earth. Moreover, the speed with which changes in resource use are taking place gives little time in which to anticipate and prevent unexpected effects (Kamble, 2013).

### **2.3 Quality of Life**

Quality of life is the important component of concern in achieving sustainable development of the country. The failure of maintaining good quality of life could cause unbalanced development in the country. In some parts of the world particularly since the mid-1950s, growth and development had vastly improved living standards and the quality of life (Sustainability, 2001). Many of the products and technologies that had gone into this improvement include raw material-intensive and energy-intensive activities which entail a substantial amount of pollution. The consequent impact on the environment is greater than ever before in human history (United Nation, n.d.). An environmental management strategy is one of the mechanisms for the achievement of targets for sustainable development goals (Sustainable Development, n.d.).

According to Scholz and Binder (2003) for maintaining good quality of life, the EDI should be reduced to a level which has less impacts and effects caused by environmental issues. These cases of EDI could be reduced with good planning and management of the environment. Management is the practical mechanism to ensure the plans are implemented in the correct order. Environmental management is a structured framework for managing an organisation's significant environmental impacts (Netherwood, 1998). In particular, the implementation of environmental management with plans would reduce the environmental problem effects. Environmental stresses and

patterns of economic development are linked to one another. Thus, agricultural policies may lie at the root of land, water, and forest degradation. Energy policies are associated with the global greenhouse effect, with acidification, and with deforestation for fuel wood in many developing nations. These stresses all threaten economic development. Thus, economics and ecology must be completely integrated in decision-making and law-making processes not just to protect the environment, but also to protect and promote development. The economy is not just about the production of wealth, and ecology is not just about the protection of nature; they are both equally relevant for improving the lives of humankind (Jenkins, 2003).

Nevertheless, good management of the environment should follow the steps outlined by Netherwood (1998), where environmental management must be arranged by stakeholders and obey the policies which have been stated by the government. Usually the policies would be reviewed often for maintenance and improvement. Then, any development activities should be registered with good planning and arrangement. Planning is needed for ensuring that the projects would run within the fixed time period. Previous research related to the environment also highlighted that the involvement of all stakeholders in searching for solutions to land management problems is now widely accepted by scientists, advisors, extension workers, and policy makers. Different stakeholders have varying degrees of influence and motivation to achieve sustainable land management (Geeson et al., 2015). Then, excellent planning would ease the implementation and operation into the projects. Implementation is the part where the stated policies are implemented in the projects, which include the implementation of rules and regulations stated in related policies. After the operation is done, then the next step is performing the checking and correction, which would result in a pass or fail. Checking is the important step for seeking weaknesses. Once weaknesses are detected, the correction should be applied as soon as possible to further avoid from negative

effects. Checking or monitoring action is an understanding of environmental worldviews that could assist management to educate internal and external stakeholders on management zones and resource use, and assist in conflict resolution amongst users, while developing effective policies, programmes, and implementation strategies (Tarrant et al., 2003).

Environmental management is the huge field which covers all the components of the environment. Attention is needed for the effective implementation of development planning. No matter the pass or failure of the management, the review should be considered more to avoid repeating of mistakes. The review will show the reports which could detect mistakes and problems. Continuous improvement is the ultimate step to ensure the plans are often improved and the quality would be maintained for the next development projects. The steps were proven by Netherwood (1998) in previous environmental management studies. One management technique, like in many developing countries particularly in Asia and Latin America, is to adopt systems for environmental impact assessment. However, the lack of institutional capacity and skilled personnel mean that these are often conducted by outside consultants, without quality checks. In some cases, government authorities would benefit from a second opinion on the environmental documentation they receive. Interested governments should create an independent international assessment body to help developing countries and, upon request, evaluate the environmental impact and sustainability of planned development projects.

Pollution-intensive and resource-based industries are growing the fastest in developing countries. These governments will thus have to substantially strengthen their environmental and resource management capabilities. Even where policies, laws, and regulations on the environment exist, they may not be consistently enforced. Many developing nations have begun to build up their educational and scientific infrastructure,

but their technical and institutional capacity for making the most of imported or new technologies remains small. Some countries thus continue to depend on outside technical and managerial skills for the maintenance of industrial operations. For lack of capital, they often find that a new industry can only be started with the support of foreign aid, commercial loans, a direct investment, or a joint venture with a transnational corporation (UNEP, 1982).

The concept of sustainable development provides a framework for the integration of environmental policies and development strategies—the term “development” being used here is in its broadest sense (Jenkins, 2003). The word is often taken to refer to the processes of economic and social change in the Third World. However, the integration of environment and development is required in all countries, rich and poor. The pursuit of sustainable development requires changes in the domestic and international policies of every nation. Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future (WCED, 1987). Far from requiring the cessation of economic growth, it recognises that the problems of poverty and underdevelopment cannot be solved unless a new era of growth is developed; in which developing countries play a large role for reaping large benefits. Similar with other developing countries, Malaysia is making an effort to achieve their mission on sustainability of the environment. Like other developing countries, no country can develop in isolation from others. Hence the pursuit of sustainable development requires a new orientation in international relations. Long term sustainable growth will require far-reaching changes to produce trade, capital, and technology flows that are more equitable and better synchronised to environmental imperatives. The mechanics of increased international cooperation are required to assure that sustainable development will vary from sector to sector and in relation to particular institutions. However, it is fundamental that the transition to sustainable development be

managed jointly by all nations. The unity of human needs requires a functioning multilateral system that respects the democratic principle of consent and accepts that not only the Earth but also the world is one.

## **2.4 Environmental Resource Development**

Development is conceived as an economic growth and is a quantitative concept that basically means more of the same. Yet, even if it is limited to just the economic sphere, it is clear that economic development is more than just economic growth alone. Economic development refers to growth accompanied by qualitative changes in the structure of production and employment, which is generally referred to as *structural change*. Of particular importance for developing economies is the increase in the share of the dynamic industrial sector for national output and employment, and a decrease of the share of agriculture. This implies that economic growth could take place without any economic development (Szirmai, 2005). In a study done by McGillivray (2008), it was shown that to be sustainable, economic growth must be constantly nourished by the fruits of human development, such as improvement in workers' knowledge and skills along with opportunities for their efficient use; more and better jobs; better conditions for new businesses to grow; and greater democracy at all levels of decision making. However, slow human development can put an end to fast economic growth. According to *Human Development Report 1996*, "during 1960–1992 not a single country succeeded in moving from lopsided development with slow human development and rapid growth to a virtuous circle in which human development and growth can become mutually reinforcing". Since slower human development has invariably been followed by slower economic growth, this growth pattern was labelled a "dead end."

Indicators of wealth, which reflect the quantity of resources available to a society, provide no information about the allocation of those resources; for instance, about more or less equitable distribution of income among social groups, about the shares of resources used to provide free health and education services, and about the effects of production and consumption on people's environment. Thus it is no wonder that countries with similar average incomes can differ substantially when it comes to people's quality of life, access to education and health care, employment opportunities, availability of clean air and safe drinking water, the threat of crime, and so on (McGillivray, 2008). In terms of economic development, GDP growth may be of interest to policy makers for many reasons, but GDP can be a misleading indicator of national income (Winter-Nelson, 1995). The World Bank has long maintained that economic growth is good for both people and the environment. This type of "win-win" situation is based on the view that an immediate benefit of economic growth is a rise in per capita income, which can contribute to alleviate poverty and to clean up the environment (Vadlamannati & Pin, 2009).

## **2.5 Environmental Resource Development (ERD) and Economic Development**

A "developing country" can exist under different terminologies used by the World Bank and the United Nations. Thus, the term "developing countries" is also known as "less-developed countries", the United Nations also uses "least developed countries", "small island developing states", and "landlocked developing countries". The World Bank's main criterion for classifying economies is gross national income (GNI) per capita, previously referred to as gross national product, or GNP. The United Nations has stated that "there is no commonly agreed definition of developing countries". In the United Nations and World Bank lists, the number of developing

countries ranges from 104 to 152. The 2008 List of Developing Countries compiled by the World Bank had 152 countries. The World Bank also includes five high-income developing economies, because of their economic structure or the official opinion of their governments, as well as several countries with transition economies, based on their low or middle levels of per capital income (Congress, n.d.). An explicit system that categorises countries based on their development level must build on a clearly articulated view of what constitutes development. In addition, there must be a criterion to test whether countries have the developing or developed status. A classification system ordering countries based on their level of development is termed a *development taxonomy* and the associated criterion is called the *development threshold* (Nielsen, 2013).

Societies have faced such pressures in the past and, as many desolate ruins remind us, sometimes succumbed to them, but generally these pressures were local. Today the scale of own interventions in nature are increasing and the physical effects of our decisions spill across national frontiers. The growth in economic interaction between nations amplifies the wider consequences of national decisions. Economics and ecology bind all countries in ever-tightening networks. Today, many regions face risks of irreversible damage to the human environment that threaten the basis for human progress (United Nation, n.d.).

Moreover, the UN Secretariat convened an expert group that issued the *Report on International Definition and Measurement of Standards and Levels of Living* (UN, 1954). As the title indicates, a distinction was drawn between standards of living (a normative concept) and levels of living (a positive concept). Although the report considered that “measurements of differences and changes in levels of living could be carried out satisfactorily without reference to norms”, it recognised that positive measures of levels of living must reflect generally-accepted aims for social and

economic policies at the international level in particular areas such as health, nutrition, housing, employment, education, and etc. (Nielsen, 2013). Some past research by Sachs and Warner (1995; 1999), Van der Ploag and Poelhekke (2009), Van der Ploag (2011), and Satti et al. (2014) stated that in practice, natural resource revenues have brought many challenges to developing countries. One of them is the natural resource curse; resource-rich countries often face lower growth rates than those of non-resource-rich counterparts (Melina, Yang, & Zanna, 2015).

## **2.6 Forest Resources Development**

Nineteenth-century British colonial enterprise was a major catalyst for change in the relations between forests and people. It fractured the forest-dominated riverine infrastructure that influenced the relations between humans and nature (Jeyamalar, 2005). Forests have played an important role in the resource-based socio-economic development of Malaysia (Oon et al., 2002). Under the Malaysian Constitution, forestry comes under the jurisdiction of the respective State Governments. As such, each State is empowered to enact laws on forestry and to formulate forestry policy independently. The executive authority of the Federal Government only extends to the provision of advice and technical assistance to the States, training, the conduct of research, and in the maintenance of experimental and demonstration stations (Penh, 2010).

Malaysia is one of the countries with high percentage of forested land among developing countries and the estimated forested land in Peninsular Malaysia (in 2010) was 5.86 million ha or 44.4% of the total land area. Besides, of the total forested land, 4.80 million ha had been designated as Permanent Reserved Forests (PRFs) under the National Forestry Act 1984. The PRFs are managed based on Sustainable Forest Management (SFM) principles and practices (Omar & Hamzah, 2012). According to the

written report by Omar and Hamzah (2012), there are three major forest types in Malaysia, namely inland forest, peat swamp forest, and mangrove forest. These three categories of forests are then divided further into the different layer of forest, such as upper montane, lower montane, upper dipterocarp, hill dipterocarp, lowland dipterocarp, peat swamp, and mangroves (see Figure 2.2). The topography of the country ranges from moderate to steep slopes. In Peninsular Malaysia, the land consists of narrow east and west coastal plains with undulating foothills skirting a core of mountainous ranges. Each forest type is related to topography, altitude, and drainage, and they are very varied (CountryProfileMalaysiaForestry, n.d.).

Human induced permanent conversion of forest land to non-forest is when part of the forest is cut and the land is cleared, and used for another purpose. Legally, forest refers to Permanent Reserved Forest or Permanent Forest Estate, Protected Area, or Totally Protected Areas (Forestry Department, 2014). Human population increase is considered to be the driving force behind deforestation (Clive, 1991). Temporary change in land use, like one rotation tree crop (up to 25 years) within forest reserves is not considered as deforestation (Omar, 2012). Besides, forest degradation, as mentioned by Omar (2012), is a direct, human-induced decline in forest canopy cover of up to 70% of the existing forest canopy cover, or at least 50% of existing forest carbon stocks.

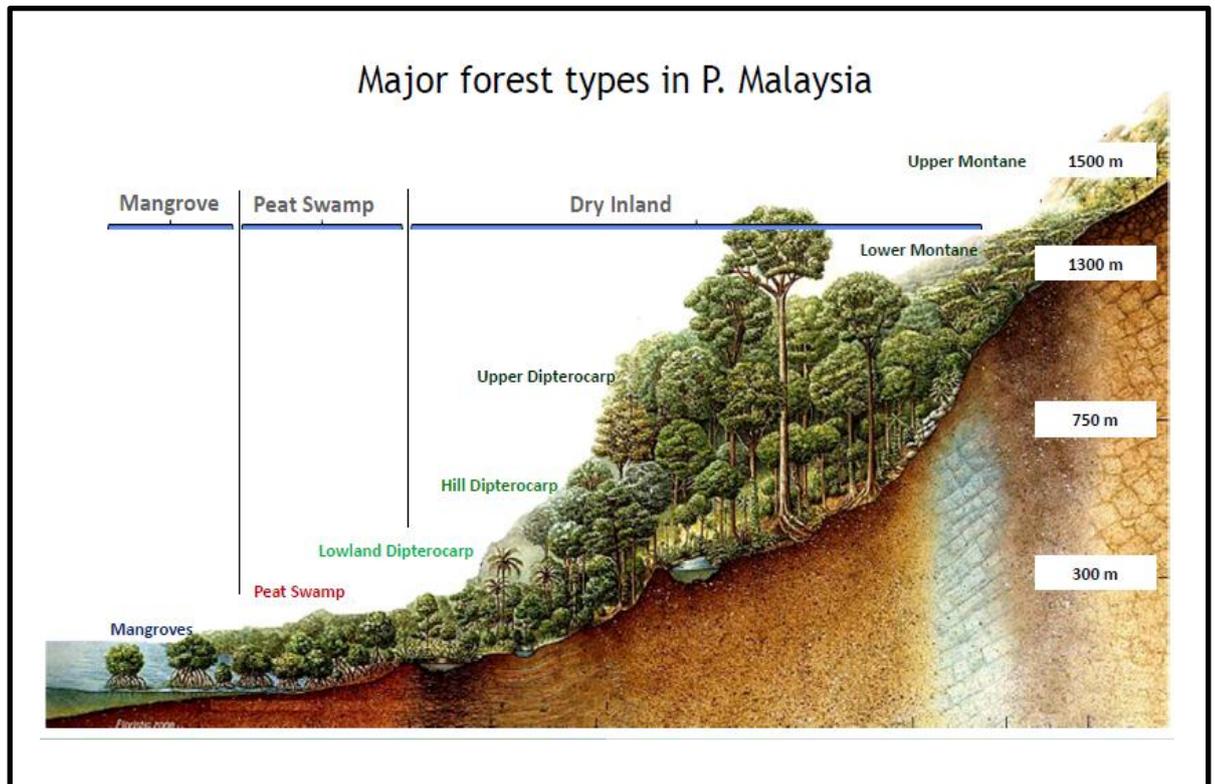


Figure 2.1 : Major forest types in Peninsular Malaysia (Omar & Hamzah, 2012).

Deforestation and forest degradation in Malaysia is a complex phenomenon with varying causes. So far, however, the focus is largely on direct or proximate causes like industrial logging, large-scale commercial oil palm plantations and agribusiness, road construction, and large dams. Far less attention is paid to the indirect or underlying causes and agents, inter-linking and working to enrich the very few, while creating hardships for many people as a result of degraded or diminished resources (Yong et al., 2014). For example, deforestation and development of agricultural fields increase provisional services, but reduce biodiversity and genetic resources (Fitzherbert et al., 2008). Natural management is considered a process by which a particular set of techniques become accepted, institutionalised, and stabilised (Majid-Cooke, 1995). Management intervention can only be taken if degradation is known ahead of time (Lewis et al., 2016). The rate of deforestation in Malaysia reached an average of 1.8% per year between 1981 and 1990, which was among the highest in the world (World Resource Institute, 1998). The main commercial crops grown in the clear-cut forests of

Malaysia are oil palms (*Elaeis guineensis*) and rubber trees (*Hevea brasiliensis*), which make up approximately 28% of the total land use (Peh et al., 2005).

The National Forestry Policy 1978 and the National Forestry Act 1984 are currently being reviewed to incorporate the new emerging issues of forestry, such as strengthening forest governance, enforcement activities, climate change, habitat loss, and food security. The National Forestry Programmes are holistically planned and implemented to enhance forest management practices, and sustain forest health and ecosystem services. The programmes look into several aspects, namely forest resources management, environmental protection, and socio-economic benefits from the forest to achieve sustainable forest management (SFM). In addition, the State's land-use policy is also being reviewed to facilitate the additional development in forestry (Lucattelli et al., 2010). To make better land-use management and conservation decisions, it is essential to evaluate ecosystem services and to understand the mechanisms underlying their dynamic changes by incorporating both ecological and social factors into relevant analyses through interdisciplinary approaches (Sakai et al., 2016).

Expanding human populations and industrial drivers, such as logging, large-scale agriculture, and exotic-tree plantations, are major causes of forest loss and degradation (Laurance, 2007). Consideration of population size is particularly important in tropical forests where diversity of tree species is high, population densities are low, and many species are insect-pollinated, which may limit pollen flow to relatively short distances (Dick et al., 2008). Natural forests in the humid and sub-humid tropics are commonly managed under selection logging regimes (Putz et al., 2012). Increased inbreeding and loss of genetic diversity can have severe negative effects on populations, for instance, reducing growth, reproductive output, ability to resist pests and diseases, and capacity to adapt to environmental variation (Ellstrand & Elam, 1993; Hughes et al., 2008). The aim of the Selective Management System (SMS) of Malaysia is to ensure

sufficient residual stock and advanced regeneration (Appanah, 1998), and enrichment planting is usually limited to cleared areas such as forest roads, logging tracks, and timber collection areas (Forestry Department of Peninsular Malaysia, *personal communication*). International criteria and indicators for sustainable forest management already require that forest managers take measures to conserve genetic diversity, but little guidance is available on how to integrate genetic conservation in the management of production forests (Jalonen et al., 2014).

If sustainable forest management standards and systems are to be effective in ensuring the sustainability of forest fuel production, several fundamental conditions must exist that allow for effective overall forest management: institutional frameworks for effective enforcement of national and international laws must exist; there must be no illegal harvesting of forests; and tenure rights must be clear at the forest management level (Stupak Inge et al., 2011). Hoelvet and Muys (2004) analysed 164 SFM standards from international processes and forest certification schemes which had been collected worldwide. They found that one cause of variation among standards was geographical origin. Standards from developing countries had more emphasis on social and economic aspects of sustainability, while standards from industrialised countries emphasised ecological forest functions more strongly. Efficient forest management and efficient enforcement of legislative requirements are prerequisites for effective certification of sustainable forest management. Supporting measures for these two basic requirements includes monitoring and assessment, education, and research. Further support and synergy may be obtained if forest certification systems operate in parallel, or together with, relevant optional international agreements, policies, recommendations, and guidelines, and means of governance for other links in forest product supply chains (Stupak Inge et al., 2011). Sustainability is increasingly addressed at more integrated levels than the individual operator level: landscape level, supply chain level, and market

and global levels. Bioenergy feedstock production is one of the factors that drive this development—large-scale problems such as greenhouse gas emissions, food security, indirect land-use changes, and competition between raw materials for different uses are major concerns.

## **2.7 Causal Chain of Environment and Development**

Due to rapid development of population and economy since reform and opening, the resource environment has been of intensive influence in Malaysia, so human-land contradiction is becoming increasingly obvious. For instance, this also has happened in China as a developing country as well (Wu & Niu, 2012). By failing to account for reductions in the stock of natural resources, standard measures of national income misrepresent actual economic growth (Winter-Nelson, 1995). National income calculations can be adjusted to account for extraction through relatively simple resource accounting techniques. These techniques have been used in many settings (Lutz, 1993; United Nations, 1992; Costanza, 1991; Repetto et al., 1989; Alfsen, Bye, & Lorentsen, 1987), as cited in Winter-Nelson (1995). The importance of change in economic structure and, therefore, the industry, has importance as a determinant of environmental degradation which has been well documented in Vadlamannati et al. (2009).

Human development is parallel with economic development. This statement was supported by Fischer-Kowalski and Swilling (2011), where the only way to resolve contemporary social and ecological challenges of the 21st Century urbanism is to adopt a development paradigm that can reconcile resource consumption and economic growth with environmental restoration and human development. Unlike the current paradigm, the notion of decoupling undermines the assumption that human development, as measured by economic growth (i.e., GDP), necessarily occurs via the increase of

resource consumption. This is not to suggest that infinite growth is reconciled with environmental sustainability, but rather that a different type of economic growth that promotes ecological restoration can assist developing countries reach a level of development that supports the aspirations of its citizens (Hyman, 2013). Furthermore, Gallopin (2003) and Hyman (2011) stated that economic growth and development via non-material growth thus becomes possible within resource-constrained economies.

## **2.8 Forest Degradation Issues**

Forest degradation became an issue and then a priority on the political and institutional agenda only after, and as a consequence of, becoming prominent on the social agenda (Boyle, 1998). There is increasing concern that practices for eradication or control of non-native species may lead to non-target effects and further environmental degradation (Rinella et al., 2009), which may be even more detrimental than the invasion itself (Smith et al., 2006; Larson et al., 2011). Visible and apparent environmental degradation catalysed the public's demand for environmental protection in the latter half of the 20th century (Keene & Pullin, 2011). The wealthy, particularly those in large industrialised countries such as the U.S., are the greatest contributors to worldwide environmental degradation (Donohoe, 2003).

There are many aspects of the national and global causes, and consequences of environmental degradation and social injustice. Causes include overpopulation, air and water pollution, deforestation, global warming, unsustainable agricultural and fishing practices, overconsumption ("affluenza"), misdistribution of wealth, the rise of the corporation, the Third World debt crisis, and militarisation and wars. Consequences include increased poverty, overcrowding, famine, weather extremes, species loss, acute and chronic medical illnesses, war and human rights abuses, and an increasingly

unstable global situation that portends Malthusian (Donohoe, 2003). Donohoe also said that a multi-faceted approach to the problems of environmental degradation and social injustice would include a shift from a throw-away economy to a reusable or recycled economy. Stronger clean air and water standards and the elimination of fossil fuel industry tax breaks and subsidies could save billions of dollars and thousands of lives each year.

In the former case, the causes of environmental degradation tend to be viewed from a particular lens or theoretical perspective, such as Neo-Malthusianism or Neo-Marxism (Jones, Regis, & Sussex, 2002; Jones et al., 2002). Such a focus may be of value in explaining other forms of environmental degradation such as deforestation. Other authors (Barraclough & Ghimire, 1996; Scoones, 1997) called for a move away from simplistic and deterministic explanations of environmental degradation (Jones et al., 2002). The idea of capability here resembles the notion of environmental endowments and entitlements, as discussed by Leach, Mearns, and Scoones (1997). It becomes clear then, that the notion of environmental entitlements alone, being only one of the four criteria, is insufficient to explain environmental degradation (Jones et al., 2002). Rural livelihoods depend on keeping people working on the land to provide them with an economic income, and also conserve the basic environmental properties of soil and water. If these things are not balanced, there can be adverse effects, such as increased land degradation (Geeson et al., 2015).

## **2.9 Forest Degradation Issues and Environmental Effects**

This is rooted on the fact that forest degradation affects human well-being, and the impact has implications on the ecological systems, either affecting the resource goods such as water, land, food, wood products, and minerals amongst others, or the

services provided by the ecosystems (for example, sinks for waste disposal and climatic control) (Mokhtar & Ghani Aziz, 2003). Developing countries face a particular dilemma caused by the relationship between future economic growth and large scale environmental degradation resulting from poor planning and unregulated development. As a developing country, Malaysia is also at a critical stage where increasing economic growth is high on its political agenda (Lee, 2010). Among factors to be considered in the introduction of tourism and recreation include habitat modification, destruction or decline of coastal areas (ecological and environmental degradation), and increased demand for treatment and disposal facilities for sewage and solid wastes (Mokhtar & Ghani Aziz, 2003).

The prospect of a green future in Malaysia, spurred by the world-wide outlook toward sustainable development and environmental preservation, is very bright. Pursuing green technology in economic and social development not only helps sustain the non-renewable fuels, and safeguards and minimises environmental degradation due to reduced carbon emissions, it also creates a strong green economy and industry—in line with the country's vision as well as the rest of the world's economies (Chua & Oh, 2011).

However, this also gives rise to problems related to public health concerns, environmental degradation which impact on the goods (biophysical resources) and services of the coastal area (Mokhtar & Ghani Aziz, 2003). Besides, with escalating oil price and environmental degradation, the Malaysian government introduced the 5FP2000 as the fifth fuel during the Eighth Malaysia Plan (8MP) 2001-2005, with more concerns placed on sustainability and efficiency of energy development (Chua & Oh, 2011). Human activities have led to the accumulation of Green House Gases (GHGs) in the environment which is responsible for environmental degradation faced today (Johari

et al., 2012). This is a serious environmental pollution, which if left unchecked could contribute toward environmental degradation experienced globally (Johari et al., 2012).

After a decade of implementing development programmes as well as continual environmental degradation improvement, coupled with the government's call for green and sustainable development, the public and private sectors have begun to show willingness in generating and implementing development programmes. Financial resources and grants are now widely available, and the cost of the equipment worldwide has also been decreasing and thus more affordable (Chua & Oh, 2011). Thus, greening activities in organisations are able to reduce environmental problems and prevent environmental degradation. Environmental sustainability does not exist by itself, instead it requires the effort in reducing environmental threats from trade and transportation, to air borne pollutants (Hooi et al., 2012).

## **2.10 Forest Management and Sustainable Development**

Sustainable development is not a new concept. In human history, many cultures have recognised the need for harmony between the environment, society, and economy. In economics, this concept has been developed in the forestry sector, where it was established that not more wood shall be cut than the forest is able to grow. Generally, sustainable development is seen as having three pillars, namely economy, ecology, and a social dimension (Li & Oberheitmann, 2009). In 1970 there were only 10 ministerial level departments of environment in the world (Ausubel et al., 1995). Today, most of the approximately 195 national governments have established at least two agencies with environmental missions, one for environmental protection and one for natural resource management (Trzyna, 2008). In addition to the thousands of national and local government agencies worldwide, the number of non-profit environmental organisations in the U.S. grew almost every year since 1960 with the annual growth rate of 4.6 per

cent since 1995, compared to 2.8 per cent for all other types of non-profit organisations. By 2005 there were more than 26,000 U.S.-based environmental organisations using multiple strategies to address a myriad of issues, including bird conservation (225), water resources and wetlands management (7291), pollution abatement (695), recycling (443) and environmental education (1213) (Straughan & Pollak, 2008; Keene & Pullin, 2011).

Environmental management is, by necessity, an interdisciplinary field and thus require interagency undertaking. For EIA to be effective, environmental and sectorial government agencies need to coordinate their efforts, share information, and cooperate to integrate EIA into the project cycle, to scope and evaluate the environmental planning and assessment effort, and to implement recommendations. This close collaboration seems to be almost completely lacking in many countries, as evidenced by the design of their EIA programmes and by specific project experiences (Boyle, 1998).

Environmental management is part of the management system that includes the organisational structure, the responsibilities, practices, procedures, processes, and resources meant to achieve and maintain a specific environmental behaviour that can reduce the impact caused by enterprise operations on the natural milieu. The entry strategy has to do with the choice of a market entry order, which is considered one of the enterprise's key strategic decisions (Kardes & Kalyanaram, 1992; Lieberman & Montgomery, 1988a; Lieberman & Montgomery, 1998; Makadok, 1998; Lee et al., 2000; Claver et al., 2007). Three aspects must be considered if there is a need to clarify the link between environmental management and economic performance. In the first place, it must be pointed out that the operationalisation of the variable "environmental management" has been treated differently in the diverse empirical studies. For this reason, it is hardly surprising to discover that some studies used environmental management indicators as part of environmental performance (Claver et al., 2007).

Good management practices generally exert a positive influence on environmental management (Claver et al., 2007). In relation to the type of activity performed by the enterprise, and particularly in sectors with the most serious pollution problems, it must be considered that there are possible sector related barriers which hinder the development of environmental management (Garces & Lacosta, 2000; Claver et al., 2007). However, despite government efforts and growing public awareness of environmental issues, environmental problems continue to persist. In response to environmental issues at global and local levels, firms have started to adopt environmental management initiatives that can be categorised into five levels, namely defensive compliance, waste minimisation or cleaner production, eco-efficiency, design for environment, and green supply chain (Eltayeb et al., 2011). The Protection Society of Malaysia has added to the intense media scrutiny of environmental problems (Green Purchasing Network Malaysia GPNM, 2003). However, despite government efforts and growing public awareness of environmental issues, environmental problems continue to persist.

Meanwhile, the formalisation of “bottom-up” community involvement in environmental management projects has been driven by past failings of “top-down” approaches (Fraser et al., 2006). Moreover, the available studies investigated only the environmental, economic, and operational outcomes of green supply chain initiatives. However, intangible outcomes, such as organisational image and customer loyalty, received little consideration as an outcome of green supply chain initiatives. Although empirical studies showed that intangible outcomes result from the adoption of internal green practices such as Environmental Management Systems (EMS), no study investigated the intangible outcomes of green supply chain initiatives (Eltayeb et al., 2011). For instance, in China, the establishment and management of natural reserves tend to be quantity-based, instead of quality-based, resulting in large numbers of

reserves, and yet poor conservation practices. After the establishment of the natural reserves, local residents were prohibited from using the natural resources inside (Zhang & Wen, 2008).

In supporting the move toward better managing the environment, ISO 14001 was established by the International Organisation for Standardisation (ISO) in 1996 and provides a framework for facilities to manage environmental issues. Firms seeking registration must commit to continuous improvement of their EMS and comply with detailed documentation and procedural requirements, laws, and regulations. Stalley (2009) stated that it is important to note that ISO itself does not stipulate environmental performance requirements; it needs to be linked to performance requirements from domestic laws or policies coupled perhaps with a corporate environmental policy. Many Chinese firms indicated that they did not have an environmental management division until they began to seek ISO certification (Zhu et al., 2013). This standard offers guidance to organisations on the phased development, implementation, maintenance, and improvement of environmental management systems that can meet the requirements of ISO 14001. ISO 14005 also includes advice on integrating and using environmental performance evaluation techniques (Gibson & Tierney, 2011).

While environmental management principles and standards provide powerful tools that have the potential to generate significant improvements to environmental performance of organisations, their focus is restricted only on creating and documenting environmental policies and procedures (Curkovic et al., 2005; Eltayeb et al., 2011). Unlike traditional environmental management, the concept of green supply chain assumes full responsibility of a firm toward its products from the extraction or acquisition of raw materials up to final use and disposal of products. It represents application of environmental management principles to the whole set of activities

spanning the entire customer order cycle, including design, procurement, manufacturing and assembly, packaging, logistics, and distribution (Handfield et al., 1997; Zsidisin & Siferd, 2001; Eltayeb et al., 2011).

Global Environmental Management Initiative (GEMI, 2001) illustrated further three ways by which resource utilisation can result in cost savings for a firm. Firstly, through minimisation of resource consumption, cost per unit can be reduced. Secondly, minimisation of wastes and discharges can result in minimisation of waste disposal efforts and costs. Finally, cost savings can result from use of alternative green materials or devices, such as utilising reused and recycled materials instead of virgin materials (Eltayeb et al., 2011). In order for participatory processes to result in real environmental management changes, it is necessary to find win-win solutions within political and economic constraints. If land management decisions are driven by political, social, or economic concerns, then participatory processes aimed at increasing environmental awareness may prove ineffective (Fraser et al., 2006). Forest management is one important factor that should concern the government. Malaysia has defined the sustainable forest management (SFM) according to ITTO definition, which is the process of managing permanent forest areas to achieve one or more management objectives for purposes of producing clearly defined goods and services in perpetuity without any reduction in value and productivity while generating no undesirable effects on the social and physical environment (ITTO, 1998).

Traditionally, developing environmental management plans has been the domain of highly trained experts who are hired for the task. It is generally perceived that this approach has led to a number of failures as these managers rarely had the benefit of detailed local knowledge and failed to generate community support for policy changes. As a result, environmental managers and policy-makers need tools to bring together local community input alongside expert advice to measure the impact of policies and

management plans. By reviewing three disparate case studies where this process had been tried, a number of lessons can be learned (Fraser et al., 2006). Besides, environmental analysis is the first step in the implementation of an environmental management system, where the process must first evaluate the environmental impacts of activities and then identify the most “significant” ones in order to define priority actions (Galan et al., 2007). The practicality of forest management in Peninsular Malaysia had been subjected to constant review and refinement to keep abreast with the latest development in forestry management and to meet the changing forest and market conditions (Talib, 2015).

Early environmental management evaluations such as this often provide incomplete information, which tend to reduce their overall utility (Gibson & Tierney, 2011). Federal agencies are required to develop and implement environmental management systems, including establishment of strategies that “support environmental leadership programmes, policies, and procedures” (Gibson & Tierney, 2011). Therefore, disasters are symptoms of unsustainable development as they represent the result of the complex interaction between potentially destructive events, such as an earthquake and tsunami, poor environmental management, and the vulnerability of a society (Albala-Bertrand, 1993; Alexander, 2000; Cutter et al., 2003; Weichselgartner, 2001; Guarnacci, 2012).

By the 1990s, many human ecology and environmental study departments that had been established in the 1970s had fallen on tough times, and the attempts to develop holistic theories in the social sciences had been countered by a resurgence of more narrowly specialised approaches. The creation of national and international programmes in global environmental change has since led to a number of institutional initiatives, which, in many respects, resemble the earlier efforts to develop interdisciplinary environmental study departments (Jamison, 2000). Moreover, the concept of urban

environmental management requires complete understating of environmental issues concerning urbanisation. Currently however, the knowledge is incomplete amongst the new professionals and capacity to meet the challenge of urban environmental management is lacking amongst professionals in most developing countries. Meanwhile, tertiary institutional efforts in inculcating professional skills are still at the infant stage (Keywords, 2005). Besides, Costantini, and Monni (2007) confirmed that human development should be the first objective of international development policies whereas an increase in human well-being is necessary to provide a sustainability path. Active participation of industrialised countries, following the general framework of the Millennium Development Goals (MDGs), is one of the necessary conditions for development.

The Millennium Development Goals, established in 2000 following the adoption of the United Nations Millennium Declaration at the United Nations Millennium Summit, were the first set of developmental goals to be agreed on by leaders of 189 Member States (Development, n.d.). Since 1970, Malaysia had achieved a number of national developmental goals. These achievements and the favourable position Malaysia now occupies in economic and social development, owe a great deal to the groundbreaking policies and strategies that were envisioned in the Outline Perspective Plans and systematically implemented through Malaysia's national five-year plans (UNDP, 2005). Malaysia has experienced three decades of impressive economic and social progress, enabling it to provide for the health and education of its people, to eradicate poverty in large measure, to build excellent infrastructure, and to become a major global exporter. Today, Malaysia faces different challenges, however, in both the external and the internal environments. The changing global landscape, financial and economic pressures, free movements of human capital, environmental issues, and profits affecting the way businesses are conducted, all have imposed the need for innovative strategies

and policies to continue the nation's progress toward Vision 2020 (United Nations, 2011). Malaysia's progress toward the MDGs has been a product of policies, strategies, and programmes directed to deal with the challenges of the time. Poverty eradication, the supreme objective among all the MDGs, was already a primary national concern in 1970, when half of all households in Malaysia were living in poverty. By 2002, just 5 per cent of households were poor, although poverty levels still vary considerably by state and ethnic group (UNDP, 2005). The seventh Millennium Development Goal (MDG7) aims for environmental sustainability. Just like MDGs 1 to 6, its indicators are quantified, time-bound, and encourage quick-win initiatives where environmental problems can be addressed while alleviating poverty (Hezri, 2013).

## **2.11 The Challenge in Forest Management**

Today, the challenges and barriers that Malaysia faces are very much different from many years ago, as the country has experienced many changes, both physically and economically, as it strives to achieve the goals of Vision 2020. With the current global landscape, financial and economic pressures, as well as the spotlight focused upon the environmental issues, the efforts of the country to achieve its rapid development goals are being hampered. It is therefore, more important than ever for all member states to re-strategise and adopt a radical change in its approach toward economic and social development (United Nation, 2011). In Malaysia, attempts had been made to mainstream environmental concerns and priorities into economic and social development plan since the 1960s, was backed by strong institutions, which had proven able to accommodate changes yet durable and stable enough to ensure continuity of actions (Hezri et al., 2012). A programme for sustainable landscape management, that includes biodiversity conservation, needs to include both firm and governmental

action, and alliances with the other stakeholders. National governments cannot delegate their role of guarantors of the conservation of a country's natural heritage, so the appropriate authorities need to build the capacity to fulfil their regulatory and management duties and responsibilities. However, civil society can share certain rights and responsibilities regarding the management of living natural resources after careful preparation and an adequate definition of roles and responsibilities. Given the interests of NGOs, business, indigenous peoples, and local communities who live within or close to protected areas, alliances should be created among stakeholders that enable each to play an appropriate role according to clear government policies and laws (Roe, 2005). The global community stands at a historic crossroads in 2015. The world has the opportunity to build on their successes and momentum, while also embracing new ambitions for the desired future outcomes. A bold new agenda is emerging to transform the world to better meet human needs and the requirements of economic transformation, while protecting the environment, ensuring peace, and realising human rights. At the core of this agenda is sustainable development, which must become a living reality for every person on the planet (United Nation, 2015).

Research done by Hezri et al., (2012) reported that Malaysia's development planning agenda is supported by sectorial policies and plans, such as The National Policy on Biological Diversity 1998, National Policy on the Environment 2002, National Climate Change Policy 2009, National Green Technology Policy 2009, and various strategic action plans to steer Malaysia toward sustainability. Since the Independence in 1957, Malaysia has embarked on rapid industrialisation. The ensuing decades saw a steady transformation of the natural environment, from forest to agricultural land and industries, including urban settlements. However, the proportion of forested land is still 62.4 per cent, a notable figure in comparison with other developed and developing countries. Many of the essential elements of the Millennium

Development Goals can be identified in these earlier policies. In fact, Malaysia's successful achievement of various socio-economic policies over the years provided a solid platform on which the country could embark on the next phase of development. Vision 2020 articulates Malaysia's aspiration to become a fully developed country in its own mould by the year 2020. The strategies to achieve this are elaborated in the Nation Vision Policy where emphasis was given to the need to build a resilient and competitive nation, as well as an equitable society that would assure continued unity and political stability (UNDP, 2005). Careful assessments of MDG success and failure will form a critical ingredient for any post-2015 policy breakthroughs. To be done well, these should examine the complex pathways through which a diversity of targets was born. The MDG story is qualitative as much as quantitative. Analysts and practitioners will also be well served to consider the factors that lead the MDGs even to be worthy of assessment (Resources, 2014).

As developing countries are at the forefront of MDG implementation, it is crucial for the member countries to monitor their progress toward achieving the MDG targets by preparing annual MDG reports. Although a number of country MDG reports have been prepared by individual member countries, either initiated by them or sponsored by the UN agencies, regional MDG reports prepared by international and regional organisations have focused on covering their constituencies only (IDB, 2011). Besides reviewing global and regional progress, assessing country-level environmental performance is also important. Comparing countries' performance to baselines might help explain progress (or lack thereof) and hence hint at opportunities for acceleration in the post-2015 period. While individual indicators help measure progress toward specific MDG targets, understanding why change happens in either a positive or negative direction requires looking at inter-linkages between goals and indicators cutting across several themes. While detailed country-level analysis was beyond the scope of this

research, connections between several MDG-7 areas could be identified. In order to establish that there is more to the connection than just co-occurrence of two unrelated factors, additional literature on the functional relationship between the respective MDG-7 factors was consulted (Pinter et al., 2015).

## CHAPTER 3: DATA ACQUISITION, ANALYSIS, & PRESENTATION

### 3.1 Introduction

Social science research methods can be described as either positivist or interpretivist (Bryman, 1988; Brannen, 1992; Neuman, 1997), with the various approaches existing on a spectrum between the fully quantitative and the fully qualitative. According to Thomas (2003), some research studies are carried out using interviews, an approach that lies closer to the interpretivist end of the spectrum. It is also a method typically used where there are specific research objectives, but flexibility is also required to enable exploration of unanticipated issues (Horton et al., 2008). Commonly used methods for data analysis were used in this study, namely timeline analysis, document analysis, qualitative analysis, quantitative analysis, and SWOC analysis, for the establishment of environmental management strategies as the output for this research.

The data acquisition and analysis processes closely followed the research objectives and questions identified in Chapter I. Table 3.1 describes the process flow of data acquisition and analysis. The flow process begins by looking at the four (4) main research objectives, where each objective is divided into several questions that are associated with the established research objectives. There are five (5) research questions for the first research objective, followed by four (4) research questions for the second research objective, and the third research objective has three (3) research questions.

Based on Table 3.1, there are three large tables describing the research, data acquisition, and data analysis stages. Then, each section is divided into different types of information. For the research part, it is divided into two types of information, namely objectives and questions, while for the data acquisition part, there are three types of information being explained, namely data sources, data types, and data extraction

techniques. Meanwhile, for the data analysis part, the type of information covers analysis techniques.

For the first research objective, in order to answer the five research questions, the researcher used different methods for each one. For research question one, data sources were from government reports, articles, journals, and books, all of which were secondary data types, and the data extraction technique was document analysis, while the analysis technique involved timeline analysis. Then, for research question two, this researcher employed the same method as in the previous research question one. Meanwhile, research question three utilised data obtained from interviews (primary data type) and journal articles (secondary data type). The data extraction techniques were document analysis and interview data review. Meanwhile regarding analysis techniques, this part involved the use of timeline analysis. For research question four, data were sourced from interviews and journal articles, both of which yielded in both primary and secondary data. Data extraction involved document analysis, while analysis technique employed was qualitative data analysis. Lastly, research question five was addressed using the same methods used in answering research question four.

The second research objective was explored using four research questions. For research question one, data were obtained from interview sessions and journal articles as sources that gave primary and secondary data types. Then, the data extraction techniques were document analysis and interviewed data review. The data analysis technique included using line graph analysis. Meanwhile for research question two, data were obtained through interviews, journal articles, and government released reports. The data types also involved both primary and secondary data. Data extraction techniques involved using interview data review and document analysis. For analysis technique, line graph analysis was used. Next for research question three, data sources included interview sessions and government reports, which namely involved primary

and secondary data types. Data extraction techniques consisted of using a questionnaire and document analysis. For research question four, the data were obtained from interview and government reports, which resulted in the gathering of primary and secondary data types. The data extraction techniques comprised qualitative analysis and document analysis. Next, the analysis technique was transcribing the transcript obtained by interview and analysing the transcript to uncover the valuable information.

For the third research objective, there were three research questions that needed to be answered with suitable techniques and methods. For research question one related to the third objective, the data were obtained by interview sessions and government reports as well. The data types were primary and secondary data, while the data extraction techniques involved qualitative analysis and document analysis. Then the analysis technique comprised transcribing the data from interview. Meanwhile, for research question two, the data sources were from interview sessions and government reports, which also involved both primary and secondary data. Similar to research question one, research question two also used qualitative analysis and document analysis for data extraction techniques. Then for analysis techniques, this researcher transcribed the interview data and performed document analysis as well. Also, the results were presented in table forms. Lastly, for research question three, the data source was in interview that involved the collection of primary data types. The data extraction technique was qualitative analysis, while the analysis technique was transcribing the data of interviews.

### **3.2 Sampling**

Based on the explanation above for the data acquisition and data analysis, the data sources yielded both primary and secondary data. For primary data sources, the data were gathered during interview sessions. Only 10 respondents were selected based on their expertise in forest development, which involved two academicians, two researchers, two project implementers, two policy makers, and two from the public. All respondents were Malaysian citizens with vast experience in their respective fields for 10 years or more. The experts in selected fields were lacking in numbers in Malaysia. Also, there were obstacles in getting the exact time for performing the interview sessions. The selected respondents were also identified based on their good experience and commitment to their respective fields. Detailed research was done before selecting the most suitable respondents. The 10 respondents were interviewed in different sessions and at different places. The times allocated for these interview sessions were between one to two hours. The respondents were required to answer each of the questions which were asked to them. The conversations were recorded using a recorder. There was no time limit for the respondent to answer the questions. The respondents needed to answer the questions verbally and needed to completely answer the list of questions. Detailed profile of respondents is attached in the appendix of this dissertation.

Meanwhile, the secondary data sources were the government reports, journal articles, newspaper cuttings, and books. The data from government reports were gathered from the first Malaysia Plan until the present one. Additionally, any reports related to the Malaysia Development Plan were obtained from University of Malaya (UM) library, National University of Malaysia (UKM) library, LESTARI UKM, Northern University of Malaysia (UUM) library, National library, University Putra Malaysia (UPM) library, Malaysia Archive, Archive in London, SIRIM, Economic

Planning Unit (EPU), Department of Statistics, Department of Environment (DOE), Federal Department of Town and Country Planning, and Department of Agriculture. Data extraction using document analysis techniques was used on these reports. These documents were collected and sorted into different categories.

### 3.3 Data Acquisition and Analysis Process

**Table 3.1: Data acquisition and analysis process**

Research		Data Acquisition			Data Analysis
Objectives	Questions	Data Sources	Data Types	Data Extraction Techniques	Analysis Techniques
RO1: To examine forest resource development in Malaysia	RQ I: What is the Trend Change in Forest Resource Development in Malaysia?	Government Report Journal Articles Books	Secondary Data	Document Analysis	Timeline Analysis
	RQ II: What are the Forest Degradation Issues associated with the Trend Change in Forest Resource Development?	Government Report Journal Articles Books	Secondary Data	Document Analysis	Timeline Analysis
	RQ III: What are the Trend Change Pattern of Intensity and Frequency of Forest Degradation Issues?	Interview Journal Articles	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis
	RQ IV: What is the Trend Change Pattern of Effects of Forest Degradation Issues on the Environment?	Interview Journal Articles	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis
	RQ V: What is the Trend Change Pattern of Impacts of Forest Degradation Issues on the Environment?	Interview Journal Articles	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis

RO2: To identify forest management strategies undertaken by Malaysia	RQ I: What is the best approach to categorise forest management efforts in Malaysia?	Interview Journal Articles	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis
	RQ II: What is the relationship between each category of forest management efforts and the degradations issues?	Interview Journal Articles Government Report	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis
	RQ III: What are the impacts on quality of life issues of forest degradation in Malaysia?	Interview Government Reports	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis
RO3: To evaluate the effectiveness of the existing forest management strategies	RQ I: What are the trend pattern changes of success in forest management strategies?	Interview Government Reports	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis
	RQ II: What are the strategies adopted in development planning in Malaysia and how the Transformation Plan could sustain and narrow the gap toward achieving forest sustainable management targets in the future?	Interview Government Reports	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis Timeline Analysis

	RQIII: Why do forest management strategies still remain enough to achieve sustainable development targets?	Interview	Primary Data	Transcribe data analysis	Qualitative Analysis
RO4: To identify the challenges in forest management related to forest resources development	RQI: How can SWOC analysis be used to ensure forest management strategies achieved its set targets of sustainable development?	Interview Government Reports	Primary & Secondary Data	Transcribe data analysis Document Analysis	Qualitative Analysis

### 3.4 Timeline Analysis

The main method in this study was the timeline analysis. This is because this study focused on the evolution of environmental management in Malaysia. Based on timeline series, data were generated into timetables and timelines. The period of time begins from 1947 until the present as the selected period for this study. This time period was divided throughout the development plan purposely. Previous research done by Nerur et al. (2008) stated in their research that the time frame can be segmented into three stages of approximately 15 years each, namely 1962-1977, 1978-1992, and 1993-2008. This 15 year range is considered suitable since it represents a significant segment of time that has

witnessed the stages of growth and maturity of an academic discipline (Ronda-pupo & Angel, 2012).

The complex environmental, social, and economic systems create methodological challenges in measuring and evaluating the effectiveness of programmes and policies, especially in attributing changes to conditions across temporal and spatial scales with regard a particular intervention (Bruyninckx, 2009; Ferraro, 2009; Gullison & Hardner, 2009; Hildén, 2009; Kennedy et al., 2009). Partly because of these challenges, monitoring initiatives have not been explicitly tied to programme goals and evaluations of programmes, and have typically focused on measuring outputs (i.e., creation of programme products and services), and not outcomes (i.e., change in environmental and social condition) (Knapp & Kim, 1998a; EPA, 2009). Output oriented evaluation results in data management and use that meets only an individual's or an organisation's needs, without establishing baselines for impact evaluations that would be relevant to the sector as a whole. Having said that (Sutherland et al., 2006), with the lack of data suitable for demonstrating progress toward key environmental and social outcomes, the environmental sector struggles to provide cogent recommendations on key issues of policy or practice (Keene & Pullin, 2011).

Furthermore, another previous research done by Shifrin (2005) established that timeline is appropriate for studying the evolution of analytical methods for environmental samples in the 20th century. Hundreds of technical papers exist for the methods noted through time. For example, there are dozens of papers describing improvements in dissolved oxygen measurement up through the 1960s, and hundreds of papers describing PCB and DDT measurements beginning in the late 1960s when this capability was first

developed. It took about 20 years; however, before this capability could be refined for quantitative environmental applications and an additional 10 years for it to be incorporated into the regulatory framework and used as a tool.

Besides, timelines analysis could also measure satisfaction. If a valid procedure for the measurement of the value of satisfaction is developed, reliability of the scores obtained through this procedure can be assessed by using the same procedures described above for assessing the reliability of financial success or timeliness of delivery time (Jan Dul & Tony Hak, 2008).

For this research, there are several alternatives to measure the success of forest management strategy based on timeline analysis. One of the alternatives is based on the Prime Minister Era, which is from the first Prime Minister Tuanku Abdul Rahman, the second was Tun Abdul Razak, the third one was Tun Hussien Onn, followed by Tun Mahathir Mohamad, then the fifth one was Tun Abdullah Ahmad Badawi, and the present one is Dato' Sri Najib Tun Abdul Razak. A second alternative could use an event or phenomenon, such as before the Independence and after the Independence. There are many aspects to measure in this alternative. Thirdly, one could use developmental planning policy in this country as a tool. There are several developmental planning policy used in different eras, like New Economic Policy (NEP), National Development Policy (NDP), Vision 2020, and National Vision Policy (NVP).

From each of these alternatives, the third one was chosen because it is related to measuring development projects, from the view of their implementation, monitoring, and assessment. From this alternative, the focus will directly answer all the research questions

thus achieving the research objectives. This point of view also looked clear compared the other two alternatives. Different stages of development have different forest degradation issues and problems associated with them. That kind of important matters and issues shall be uncovered in their true light in this country through this alternative. However, for the chosen view, the data should be collected from a variety of aspects, namely from documents, government reports, survey to get opinion from some of the different types of society members, and interview of some individuals who are experts in this field of study.

### **3.5 Document Analysis**

Document analysis is the detailed examination of documents produced across a wide range of social practices, taking a variety of forms from the written word to visual image. The significance of these documents may be located in the historical circumstances of production, in their circulation and reception of the item, and also the social functions, interpretations, effects, and uses that may be associated with them (Analysis, 2013).

Besides, document analysis is one of the types of techniques involving secondary data. For instance, they draw on the published literature and public documents of government and non-government agencies to characterise and assess the upland “agricultural” socio-technical regime, alternative niches for upland land-use and livelihoods, and the broader socio-economic landscape (Lebel, 2011).

In this research, all documents related to the research topic were selected. The types of documents were historical government reports, newspaper cuttings, magazines, and journal articles. All these documents were divided at different stages, which meant that the data are arranged appropriately based on categorisation.

### **3.6 Qualitative Analysis**

#### **3.6.1 In-depth Interview**

An interview is also one practical medium for achieving some of the required research objectives. Commonly, the interview is also part of the qualitative method. Besides this, other tools could also help establish the data of this research. In this study, some of the interviews also provided data from the perspectives of researchers, academicians, project implementers, policy makers, and the general public as well.

All the questions were developed as a structured instrument and protocol. Interview sessions were conducted in strategic places and with ample free time. These interviews were recorded and analysed using transcription analysis. The transcribing of data was done manually followed by identifying the answers of the questions. Each of the answers was marked and highlighted based on the appropriate questions. The responses provided to the open-ended questions in both the questionnaire instrument and semi-structured interview were collated for qualitative data analysis. This view is reinforced by Patton (2002) who highlighted that the purpose of gathering responses to open-ended

questions is to enable the researcher to understand and capture the points of view of other people. For collecting the data through interviewing people, there are steps and phases from the beginning until the end of analysing the raw data. Below are the phases for the steps;

- I. Phase one: The information from literature review was conducted to choose the best methods to answer the particular research objective. After going through this process, the researcher then decided to start collecting data by selecting the exact person who are qualified and expert in their fields. During this phase, the potential people who are experts in their fields were identified. The identification of respondents was through seeking and searching information about them using a variety of methods. These methods included Internet access, reports, and books at library; meeting in conferences or discussion; recommendations from people who know them well; and reading a lot of article sources about them. The profile of respondents is stated in the appendix of this dissertation.
- II. Phase II: After the identification of respondents was done, then researcher decided to select 10 persons who are experts and related to the topics of research. The next step involved the researcher sending appointment letters to meet them for interview sessions. The letter was sent by email and faxed. To ensure the letter reached them, follow-up calls were needed to get feedback. This phase was quite tricky because the respondents needed to really confirm about the time and date and commit to the interview. The researcher waited for a certain amount of time (cooling period) and then went to meet them after confirmation. Most respondents requested the set of questions to be asked in the interview to be sent beforehand.

The purpose was to ensure that they would be ready with the required information and fulfil the requirements of all the interview questions. The researcher sent the questions in the form of a questionnaire.

- III. Phase III: After confirming the date and suitable time, the researcher went to the agreed upon locations stated by the respondents, thus the interview session was performed in different places and at different times for each respondent. The sessions took between one to two hours each. In order to complete all the interview sessions for the 10 respondents, the researcher spent six months in this phase. The respondents lived in Kuala Lumpur and Selangor areas. Even when some locations of respondents were close, the time constraints of respondents had to be taken into consideration. In some instances when the date of interview was confirmed, at the very last minute, some respondents had to reschedule the interview as they were called for urgent meetings or other pertinent matters. These disruptions were unexpected and would not be avoided, so a different date and time re-confirmed. During the interview sessions, the researcher also asked respondents relating other questions which had come to mind. Then, these new questions and answers were also noted in the adding up of data.
- IV. Phase IV: Then, the next step after completing all interview sessions, the data in the recorder were then duplicated. The raw data was transferred to a pen drive and external hard disk to ensure all data are safe. After that, the researcher started the transcribing of each interview data. The data transcription was saved in different files to avoid confused and redundant data. The data were saved in files which

were easy for the researcher to identify them. This phase took six months to completely transcribe the interview data.

- V. Phase V: The next step was writing up the analysis of data which is the analysing of data used thematic analysis. The detailed is in Chapter V, namely Results, Presentations, and Interpretations. In this chapter, the research objective was achieved through answering the research questions for this study.

The interview differs from the questionnaire in the nature of its questions and its manner of presentation. The questionnaire is useful for asking very specific questions concerning quantifiable information, such as age, income, and gender for converting general information into a closed form through rating or ranking (Rob, & Nicholas, 2000). Qualitative data analysis is largely an inductive, open-ended process that is not easily captured by a mechanical process of assembly-line steps (Lofland, 1995). A study done by Dey (1993) suggested that the core of qualitative analysis consists of the description of data, the classification of data, and seeing how concepts interconnect. While the following prescription has been written as if all the data were generated before any analysis starts, it can equally be used to start making sense of data as they are generated. Then, the researcher can begin to describe, classify, and connect the data before having a full data set.

### **3.6.2 Description, Classification, and Connection**

Description concerns the portrayal of data in a form that can be easily interpreted. A description might be a verbal or written account of the data or a graphical illustration.

The description of qualitative data is usually thicker and richer in nature. Thick description seeks to provide a more thorough and comprehensive description of the subject matter. It includes information concerning the situational context, the intentions and meanings associated with an act, and the process in which the situation is embedded (Rob, & Nicholas, 2000).

Classification is moving beyond data description in trying to interpret and make sense of the data. By undertaking interpretative analysis, the researcher sought to more fully understand the data generated and make the data meaningful to others. In this process, the researcher started to identify which factors are important or more salient, to draw out communalities and divergences. By classifying the data, the researcher can then start to make more effective comparisons between cases.

Meanwhile, connection is concerned with the identification and understanding of the relationship and associations between different classes. This consists of more than just identifying the similarity or difference between categories.

### **3.6.3 Transcribing and Annotation**

The first stage after garnering research data was to transcribe notes or interviews into coherent transcripts. If the data are from a secondary source, the relevant sections should be transcribed. There are two main methods of transcribing the data. The first is to transcribe all the data provided within one data generation session onto a single script. In addition to the transcription of the data, it is important that the researcher fully transcribes

a thick description to accompany the data. Once finished, the complete transcription then should be thoroughly annotated. The researcher started annotating the data immediately after transcribing it, while both the interview and transcription are still fresh in mind. Annotations, in particular, open the data up and start the process of analysis in earnest. Annotating data will make subsequent categorisation and connecting processes easier. Annotating is also extremely useful guides for future data generation (Dey, 1993).

### **3.6.4 Categorising Qualitative Data**

Categorising quantitative data is relatively straightforward. Numeric data are easily grouped into ordinal, nominal, interval, and ratio categories and the relationships between data in these categories are logical. Categorising qualitative data is not simple because the data consist of non-numeric information, and there can be a few logical relationships between the data. The easiest way of classifying the data, if the researcher carried out a systematic interview or observation study, is to group the answers to specific questions or observations. Dey (1993) suggested that categories should have an internal aspect (they must be meaningful in relation to the data) and an external aspect (they must be meaningful in relation to other categories). Categories then should not be created in isolation from other categories within the analysis.

### **3.6.5 Splitting and Splicing**

Splitting and splicing is concerned with reassessing the organisation and data management of data within sorted categories. This stage then has two purposes. Firstly,

the researcher considered ways of refining or focusing analysis in the light of any revelations while categorising the data. Playing with the data in various ways will probably lead to more insights than just by reading the transcripts alone will have failed to highlight. Secondly, this acts as a cross-checking phase (Dey, 1993).

### **3.6.6 Linking and Connecting**

Linking and connection concern the process of trying to identify how the reorganised data “hang together” within the context of the original transcripts. Whereas categorisation and comparison are concerned with the identification of formal connections either similar or different, finding associations and links concern the identification of substantive connections (Dey, 1993).

### **3.6.7 Corroborating Evidence**

The corroboration of conclusion is an extremely important part of qualitative data analysis. Since the qualitative analysis is interpretative and relies on the ability of the researcher to make informed and impartial judgements, the process is open to abuse. Evidence can be fabricated, discounted, and misinterpreted. Misinterpreting evidence is not a deliberate attempt to fabricate the result of a study. Corroborating evidence concerns the cross-checking of conclusions in the attempt to avoid genuine errors in analysis and interpretation. Corroboration is aimed at avoiding some of these criticisms

by strengthening the claims made from the qualitative data. It is concerned with integrity and validity (Dey, 1993).

### **3.7 Observation**

Another common method used to measure the evolution of forest management strategy is through observation. Media capture is one of the tools use for this method, which is one technique for obtaining information to answer the research questions. Part of media capture includes reading newspaper cuttings by the year of the time period. These could be gathered from the archive collection of a library, particularly. Besides, historical pictures have been proven to be good material for establishing data information. Observation also allows the researcher to record the lives of the people rather than asking them to reflect critically upon their actions in an artificial social encounter, such as an interview. For this study, most of the media capture was obtained from the literature review and archived materials.

### **3.8 SWOC Analysis**

Basically, SWOC analysis was also used in this research. Strengths, Weaknesses, Opportunities, and Constraints (SWOC) analysis is a commonly used tool for analysing environments in order to attain a systematic approach and support for a decision situation (Kotler, 1988; Wheelen & Hunger, 1995). The internal and external factors are most

important to the enterprise's future, which are referred to as strategic factors, and they are summarised within the SWOC analysis. The final goal of the strategic planning process, of which SWOC is an early stage tool, is to develop and adopt a strategy resulting in a good fit between the internal and external factors, and the goals of the owners (Kangas, Kurttila, Kajanus, & Kangas, 2003).

The SWOC method, which was developed in the 1960s, has been used recently within the context of many private and public organisations (Bernroider, 2002; El-Khishin, 2003; Jackson et al., 2003; Dyson, 2004; Doratli et al., 2004; Sorensen et al., 2004; Srivastava et al., 2005). SWOC analysis is widely recognised and it constitutes an important basis for learning about the situation and for designing future procedures which can be seen as necessary for thinking in a strategic way. When elaborating the SWOC matrix, the favourable and unfavourable aspects are established regarding the development of the area, while distinguishing the internal and external variables. That is, strengths, weaknesses, opportunities, and threats are established. On the one hand, negative factors are grouped together with respect to development possibilities, i.e., weaknesses (internal elements that cannot be modified in the short-term) and threats (external elements) (Lozano & Vallés, 2007).

On the other hand, positive factors for further development are shown, i.e., strengths and opportunities, internal in the former case, external in the latter. It has been said in previous documentation that they are not used to distinguish between internal and external factors because it has been considered more comprehensible and useful to differentiate among strengths, weaknesses, opportunities, and threats. This approach has been chosen in the text and tables. Another advantage of this technique is that SWOC is

such a simple tool that everybody can participate in and even apply the principles by themselves, in a group or alone without external technical support (Sorensen et al., 2004).

However, the SWOC framework also presents limitations. Thus, there are authors that consider it a simplistic, static, and subjective technique, and that it does not communicate any information in itself where the results solely depend on the analyst that carries it out (Panagiotou & Van Wijnen, 2005). This is why some authors proposed using SWOC in combination with other techniques, such as for example, Porter's Five Forces Model (Ruocco & Proctor, 1994), Analytic Hierarchy Process (Kurttila et al., 2000), Kaplan and Norton's Balanced Scorecard (Lee & Sai On Ko, 2000), or the Cross Impact Analysis (Proctor, 2002). Other authors proposed alternative methodologies, based on SWOC, such as TOWS Strategic Matrix (Wehrich, 1982), VRIO framework (Barney, 1995), WOTSUP (Hussey et al., 1997), SOFT (Hussey et al., 1997), "telescopic observations" strategic framework (Panagiotou & Van Wijnen, 2005), and many others (Lozano & Vallés, 2007).

In this study, SWOC analysis must be the final stage of the analysis process, as compared to the others. This is because SWOC analysis will conclude the results of the study by arranging the data into a strategic context. The SWOC analysis will show the strengths, weaknesses, opportunities, and constraints of this study. Through this analysis, it would frame the gap of knowledge and results of the data analysis itself. Moreover, SWOC analysis will help to generate new knowledge and new information according to this overall study. Each one of the results is put into the table based on the results from the other analyses included in this study.

### **3.9 Conclusion**

This chapter explained the method and techniques employed to analyse the evolution of environmental management strategies. Practical methods were used to fulfil all the objectives in this study. A total combination of six analyses in this study would enable the researcher to achieve the aims of research. This combination of analyses is compatible with each other. The differentiation of techniques would present different part results to add to the overall story. The primary and secondary sources of data were needed to ensure the diversity of results as well. Ultimately, the choice of method in research should be appropriate for achieving the research objectives and answering the research questions as well.

## **CHAPTER 4: MALAYSIA – DEVELOPMENT GROWTH, FOREST DEGRADATION, AND FOREST MANAGEMENT**

### **4.1 Introduction**

The Malaysian population, according to the recently published EPU report in 2015, shall approximately increase by 482,954 people which would total almost 31,127,247 people beginning 2016. The increasing population numbers is related with the economic situation in the country. Economic statistics in Malaysia for the past 10 years in terms of Gross Domestic Product (GDP) showed that Malaysia is performing well. Every year the GDP growth rates increased by 5 to 6 per cent (EPU, 2013). The main sources of economic contribution are manufacturing and services sectors. Moreover, agriculture, forestry, fishing, and mining are also the big contributors to Malaysia's economic well-being.

Malaysia covers an area of about 330,803 square kilometres, consisting of several states in Peninsular Malaysia, namely Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Perak, Perlis, Penang, Selangor, Terengganu, and the Federal Territories of Kuala Lumpur and Putrajaya; and Sabah and Sarawak on the Island of Borneo and the Federal Territory of Labuan off Sabah. Malaysia lies entirely in the equatorial zone and the average daily temperature throughout Malaysia varies from 21°C to 32°C and a relative humidity of 80 to 90%. Rain usually occurs between November and February in eastern Peninsular Malaysia, western Sarawak and north-eastern Sabah, while in the west coast of the Peninsular, the rainy seasons occurs in April-May and October-November (Badgie, Samah, Manaf, & Muda, 2012). Malaysia is a multi-ethnic

country. The principal ethnic groups are Malay, Chinese and Indian. Other significant groups are the indigenous people of Sabah and Sarawak, including Kadazan, Dusun, Bajau, Murut, Iban, Bidayuh, and Melanau. Malaysia practises a system of parliamentary democracy under a constitutional monarchy. It has three branches of government, namely the Executive, the Legislature, and the Judiciary (EPU, 2013).

Two monsoon periods occur between November—March and May—September. Rainfall is abundant, averaging 2,000mm to 4,000mm annually. Clouds cut off a substantial amount of direct sunlight in the afternoon and evening. Malaysia receives about 6 hours of direct sunlight daily. Malaysia's forests are very rich in species and are extremely complex ecosystems. In 2000, 56% of total land area was forested whilst in 2007, it was 55%. Malaysia is also considered one of the world's mega-diverse countries and ranked 12th in the world on the National Biodiversity Index (NRE, 2011). Forests have played an important role in the resource-based socio-economic development of Malaysia. In accordance with Malaysia's Federal Constitution, the legislative control of land and forests is a state matter and the state governments have complete jurisdiction over their respective forest resources (Talib, 2015).

Environmental policy in Malaysia had been adopted in 2002, namely under the implementation of the Eighth Malaysia Plan (2000-2005). During the time period after that, the Malaysian GDP was RM211,227 billion in 2011, which increased to RM219,988 billion by 2012 (EPU, 2012). Based on the total GDP in 2002, the classification of main sectors that contributed large portions to the GDP were services with RM127,872 billion, followed by manufacturing (RM65,872 billion), and the combined sectors for agriculture, forestry, and fishing contributed RM19,036 billion. Meanwhile for mining sector, it

generated RM15,774 billion and the construction sector contributed RM7,275 billion. The documented statements reported which sectors were related with the environment and gave high impact on Malaysia's economy directly. The increasing economic performance will affect environmental resources as well, because any sectors will influence the environment directly (Malaysia Plan, 2001a).

As Malaysia built its economic foundations, the concern for the environment and sustainability was firmly rooted previously in the Third Malaysia Plan (1976-1980). Not only were a set of guiding principles established to maintain a healthy environment for human habitation, there was also emphasis on the need to preserve natural heritage and take into account the impact of population growth and industrialisation being clearly recognised. By the time the Fifth Malaysia Plan (1986-1990) came into being, environmental protection was already a key factor in the equation for national progress. Among the many efforts to sustain both economic and environmental soundness were actions to minimise the impact of human activities related to deforestation, urbanization, and tourism, emphasise prevention through conservation instead of curative measures, and incorporate environmental planning into development projects (Malaysia Plan, 1986).

Moreover, the emphasising on sustainability within the UN system was renewed in the outcome document of the United Nations Conference on Sustainable Development, Rio+20, namely "The Future We Want". However, sustainable procurement (SP) is one of the main means to achieve sustainability according to Agenda 2114 and Chapter III of the Johannesburg Plan of Implementation 15. SP is also known as one of the thematic priorities of the UN High Level Committee on Managements Procurement Network

(HLCM PN), implemented through its Working Group on Sustainable Procurement. UN procurement spending, which represented \$17.2 billion in 2014, can influence markets to move toward achieving innovation and sustainability. Through its significant purchasing power, UN organisations can deliver key policy objectives within all areas of sustainable development. With respect to the environment, SP can help organisations to reduce greenhouse gas emissions, improve water efficiency, and support recycling by incorporating concepts such as whole life costing. Positive social results from SP include capacity building, poverty reduction, and improved equity. From the economic perspective, SP can generate income, optimise costs, and support the transfer of skills and technology (UNOPS, 2015).

#### **4.2 Environmental Resources Development and Forest Resources Development**

Efforts have been underway to strengthen the legislative framework through continuous review, updating, and amending where practical to meet future needs. In addition, Malaysia is developing expertise and tools such as environmental auditing and natural resources accounting to help quantify impacts on the cost of environmental regulation. In particular, a system of Natural Resource Accounting is being developed to illustrate the effects of economic development on the natural resource base and the refinement of economic indicators. Malaysia also uses five-year plans, which seek to implement strategies and programmes and allocate funds to realise the objectives and commitments of the National Development Policy. The results of the Rio process generally, and of Agenda 21 particularly, were incorporated and, where appropriate,

integrated into the national planning process.

Overall, environmental and natural resource management is guided by long-term sustainability needs and improvement in the quality of life. The policy aims at promoting economic, social, and cultural progress through environmentally-sound and sustainable development. Emphasis is placed on addressing environmental and resource management issues in an integrated and holistic manner. Steps are taken to identify prudent, cost-effective, and appropriate management approaches that yield multiple benefits in order to ensure that development is sustainable and resilient.

Steps also were taken to strengthen the database for environmental decision-making by introducing the use of sustainable development indicators. This system includes natural resource accounting, environmental auditing, and environmental costing. Efforts are directed at collecting data in an integrated manner to facilitate analysis on the sustainability of a sector or state. These indicators of sustainability enable the Malaysian government to ascertain the impact various sectors have on the environment, making it easier to plan remedial land use, since planning will be strengthened as regulations are introduced to control access to biological resources, as well to address biosafety issues, such as those relating to genetically modified organisms. A specific example is the overall management of marine affairs, which is reviewed to address multiple-use conflicts in marine areas, alleviate pressure on the marine environment, and thus enhance marine and coastal biological diversity.

The tropical rain forests of Malaysia are extremely complex ecosystems and are richer in tree species than in similar areas of Africa and South America. They are, in fact,

the most species rich plant communities known anywhere in the world (Whitmore 1975) and have evolved over millions of years. There are at least 15,000 species of flowering plants, of which 2,500 are tree species; 286 species of mammals; 600 species of birds; 140 species of snakes; 150 species of frogs and thousands of species of insects, many of which are still being documented. In addition, over 1,300 plant species have been identified as having potential pharmaceutical properties with some of them currently being used as traditional herbal medicine (Thang, H.C. 2009). In Peninsular Malaysia is estimated to contain 8,000 flowering plants, a total 2,650 species are tree species with 890 of them reaching harvestable sizes of at least 45cm dbh (Mohd Yunus, 1993; Primack and Lovejoy, 1995 and Anon, 1996). The shrub stratum and ground layer contain not less than 1,300 species of herbs and 70 species of ferns identified to have medicinal values (Mohd Hizamri, 1993).

Funds for programmes and projects to promote environmental protection initiatives and cleaner technologies are mainly from the Malaysia government's annual budget. In addition, donor agencies provide funding for specific programmes related to pollution control and other environmental activities. Malaysia participates actively with regional and international organisations to support environmental protection programmes and demonstration projects to highlight the application of technology transfer. The Department of Environment participates in bilateral and regional programmes to address environmental issues of mutual concern.

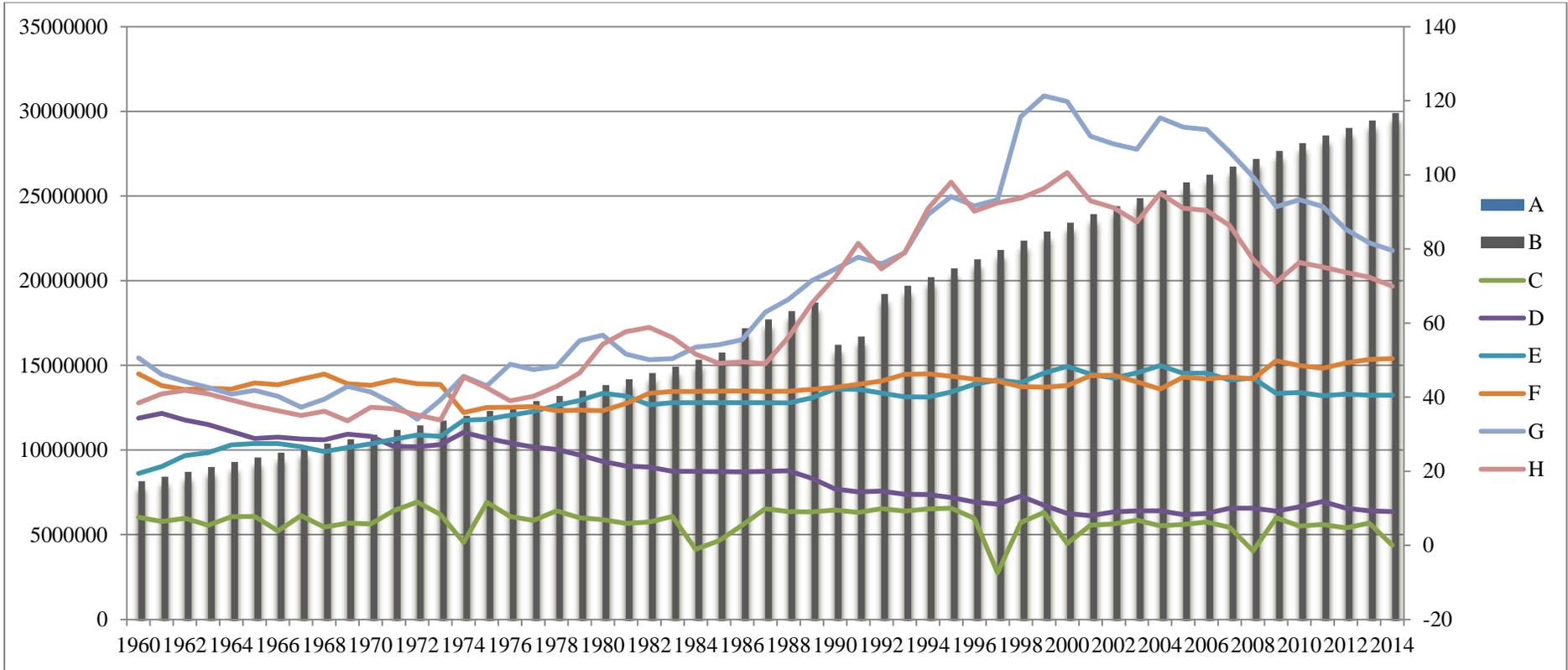
### 4.3 Energy Utilisation

As a developing country, Malaysia has been constantly trying to meet the ever increasing energy demand, whilst improving the dynamic energy growth in a cost-effective manner. In 2000, the Malaysian population was reported at 23.3 million. At the estimated steady growth rate of 1.8%, by 2020 and 2030, the total population is predicted at 33.4 and 37.4 million, respectively, thus underlying the rising industrialisation and social civilisation as its key drivers (Foo, 2015).

In an attempt to achieve sustainable development, Act 172 was strengthened and updated in 1995 (Act A933), particularly with regard to the protection of the natural environment from the impacts of development. Amendments included the preservation and planting of trees, preservation of natural topography, provision of open spaces, and a requirement for submitting development proposal reports in all planning permission application. The government is intensifying on-going efforts as well as introducing new approaches to enhance land use planning. This includes the identification of integrated planning for environmentally sensitive areas. All states are encouraged to identify, map, and gazette environmentally sensitive areas to prevent inappropriate development from encroaching into these areas.

Figure 4.1 and Tables 4.1, 4.2, and 4.3 describe the Malaysian development trends from 1960 to 2014. The bar graph shows the total population increasing since 1960 until 2014. Economy growth fluctuated between 1960 and 2014. Industrialisation is one of the events which keeps moving and increasing with the time. The development of agriculture in Malaysia decreased since 1990, because industrialised sector took over as the focus for greater economic development.

The development trend between 1960 until 2014 also showed the increasing economic sectors for imports and exports of goods and services. All these things proved that Malaysia is actively engaging in improving economic development since many years ago. The consumption of environmental resources is controlled by the government to ensure each of the economic activities and environmental concerns are balanced. The increasing population brings the means of increasing utilities. To cater for a good quality of life, the government has put in place good utilities while utilising resources wisely.



(Resources Data from database: World Development Indicators Last Updated: 11/12/2015)

<b>B</b>	<b>Total Population</b>
<b>C</b>	GDP growth (annual %),
<b>D</b>	Agriculture, value added (% of GDP) Unit (0.0),
<b>E</b>	Industry, value added (% of GDP) Unit (0.0) ,
<b>F</b>	Services, etc., value added (% of GDP) Unit (0.0),
<b>G</b>	Exports of goods and services (% of GDP) Unit (0.0) ,
<b>H</b>	Imports of goods and services (% of GDP) Unit (0.0)

**Figure 4.1: Malaysia development trend (1960 – 2014)**

**Table 4.1: Malaysia Development Trend (1960 – 1979)**

**COUNTRY: MALAYSIA (Year 1960 – Year 1979)**

<b>A</b>	<b>1960 [YR1960]</b>	<b>1961 [YR1961]</b>	<b>1962 [YR1962]</b>	<b>1963 [YR1963]</b>	<b>1964 [YR1964]</b>	<b>1965 [YR1965]</b>	<b>1966 [YR1966]</b>	<b>1967 [YR1967]</b>	<b>1968 [YR1968]</b>	<b>1969[YR1969]</b>
<b>B</b>	8160975	8429369	8710678	8999247	9287442	9569784	9844116	10111920	10375877	10640347
<b>C</b>	3.2	3.2	3.3	3.3	3.2	3	2.8	2.7	2.6	2.5
<b>D</b>	2441020468	2422724549	2543810842	2708474902	2899751381	3187851289	3392767700	3515850950	3667209758	4050763024
<b>E</b>	7.6	6.4	7.3	5.4	7.7	7.8	3.9	8	4.9	6
<b>F</b>	34.3	35.6	33.8	32.6	30.7	28.8	29.2	28.7	28.5	30
<b>G</b>	19.4	21.3	24.2	25	27.1	27.5	27.5	26.6	25.3	26.4
<b>H</b>	46.3	43.1	42	42.4	42.2	43.8	43.3	44.8	46.2	43.6
<b>I</b>	50.6	46.1	44.2	42.6	40.8	41.8	40.2	37.3	39.4	42.9
<b>J</b>	38.4	40.9	41.8	40.9	39.2	37.6	36.3	35	36.2	33.6
<b>A</b>	<b>1970 [YR1970]</b>	<b>1971 [YR1971]</b>	<b>1972 [YR1972]</b>	<b>1973 [YR1973]</b>	<b>1974 [YR1974]</b>	<b>1975 [YR1975]</b>	<b>1976 [YR1976]</b>	<b>1977 [YR1977]</b>	<b>1978 [YR1978]</b>	<b>1979[YR1979]</b>
<b>B</b>	10908634	11182078	11460080	11741849	12025930	12311782	12599655	12891715	13191699	13504433
<b>C</b>	2.5	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.3	2.3
<b>D</b>	4276665304	4514334695	5364357962	8150688748	10100863614	9890359255	11753574881	13975278632	16658322510	21602645107
<b>E</b>	5.8	9.4	11.7	8.3	0.8	11.6	7.8	6.7	9.3	7.4
<b>F</b>	29.4	26.7	26.6	27.2	30.5	28.9	27.6	26.5	25.9	24.4
<b>G</b>	27.4	28.6	29.8	29.4	33.7	34	35.1	36.1	37.8	39.1
<b>H</b>	43.2	44.6	43.6	43.4	35.8	37.2	37.3	37.4	36.3	36.5
<b>I</b>	41.4	38.2	34	39.2	45.6	43	48.9	47.4	48.3	55.2
<b>J</b>	37.3	36.8	35.2	33.8	45.4	42.5	39	40.2	42.9	46.5

(Resources Data from database: World Development Indicator Last Updated: 11/12/2015)

<b>A</b>	<b>YEAR</b>
<b>B</b>	Total Population
<b>C</b>	Population growth (annual %),
<b>D</b>	GDP (current US\$),
<b>E</b>	GDP growth (annual %),
<b>F</b>	Agriculture, value added (% of GDP) Unit (0.0),
<b>G</b>	Industry, value added (% of GDP) Unit (0.0) ,
<b>H</b>	Services, etc., value added (% of GDP) Unit (0.0),
<b>I</b>	Exports of goods and services (% of GDP) Unit (0.0) ,
<b>J</b>	Imports of goods and services (% of GDP) Unit (0.0)

**Table 4.2: Malaysia Development Trend (1980 – 1999)**

**COUNTRY: MALAYSIA (Year 1980 – Year 1999)**

A	1980 [YR1980]	1981 [YR1981]	1982 [YR1982]	1983 [YR1983]	1984 [YR1984]	1985 [YR1985]	1986 [YR1986]	1987 [YR1987]	1988 [YR1988]	1989 [YR1989]
B	13833739	14180093	14543585	14926976	15333369	15764340	17202032	17707064	18211097	18709835
C	2.4	2.5	2.5	2.6	2.7	2.8	2.9	2.9	2.9	2.9
D	24937045130	25463038402	27287163557	30682563382	34565849233	31772244232	28243102990	32181695704	35271882054	38848565893
E	6.9	5.9	6.3	7.8	-1.1	1.2	5.4	9.9	9.1	9
F	22.6	21.4	21.1	20	20	19.9	19.8	20	20.1	18.1
G	41	40.3	37.9	38.5	38.5	38.5	38.5	38.5	38.4	39.8
H	36.3	38.3	41	41.5	41.5	41.6	41.7	41.5	41.6	42.1
I	56.7	51.6	50.1	50.4	53.5	54.1	55.5	62.9	66.4	71.4
J	54.3	57.7	58.8	56.1	51.6	49.1	49.5	49	56.2	65.3
	1990 [YR1990]	1991 [YR1991]	1992 [YR1992]	1993 [YR1993]	1994 [YR1994]	1995 [YR1995]	1996 [YR1996]	1997 [YR1997]	1998 [YR1998]	1999 [YR1999]
B	16221767	16703500	19204700	19700762	20205992	20725374	21260881	21808125	22358128	22900079
C	2.8	2.7	2.6	2.6	2.5	2.5	2.6	2.5	2.5	2.5
D	44023808155	49133851465	59151684070	66894448025	74481194985	88832454525	1.00851E+11	1.00169E+11	72175568255	79148158936
E	9.5	8.9	9.9	9.2	9.8	10	7.3	-7.4	6.1	8.9
F	15.2	14.4	14.6	13.8	13.7	12.9	11.7	11.1	13.3	10.8
G	42.2	42.1	41.1	40.1	40	41.4	43.5	44.6	43.9	46.5
H	42.6	43.5	44.3	46.1	46.3	45.6	44.8	44.3	42.8	42.7
I	74.5	77.8	76	78.9	89.2	94.1	91.6	93.3	115.7	121.3
J	72.4	81.5	74.6	79	90.8	98	90.2	92.4	93.7	96.3

(Resources Data from database: World Development Indicators Last Updated: 11/12/2015)

A	YEAR
B	Total Population
C	Population growth (annual %),
D	GDP (current US\$),
E	GDP growth (annual %),
F	Agriculture, value added (% of GDP) Unit (0.0),
G	Industry, value added (% of GDP) Unit (0.0) ,
H	Services, etc., value added (% of GDP) Unit (0.0),
I	Exports of goods and services (% of GDP) Unit (0.0) ,
J	Imports of goods and services (% of GDP) Unit (0.0)

**Table 4.3: Malaysia Development Trend (2000 – 2014)**

**COUNTRY: MALAYSIA (Year 2000 – Year 2014)**

A	2000 [YR2000]	2001 [YR2001]	2002 [YR2002]	2003 [YR2003]	2004 [YR2004]	2005 [YR2005]	2006 [YR2006]	2007 [YR2007]	2008 [YR2008]	2009[YR2009]
B	23420751	23920963	24401977	24869423	25332026	25796124	26263048	26730607	27197419	27661017
C	2.3	2.1	2	1.9	1.8	1.8	1.8	1.8	1.7	1.7
D	93789473684	92783947368	1.00846E+11	1.10202E+11	1.2475E+11	1.43534E+11	1.62692E+11	1.93549E+11	2.30812E+11	2.02257E+11
E	0.5	5.4	5.8	6.8	5.3	5.6	6.3	4.8	-1.5	7.4
F	8.6	8	9	9.3	9.3	8.3	8.6	10	10	9.2
G	48.3	46.2	45.1	46.6	48.5	46.4	46.5	44.6	45.1	41
H	43.1	45.8	45.9	44.1	42.2	45.4	44.9	45.4	44.9	49.8
I	119.8	110.4	108.3	106.9	115.4	112.9	112.2	106.2	99.5	91.4
J	100.6	93	91.1	87.3	95	91	90.4	86.3	77.2	71.1

A	2010 [YR2010]	2011 [YR2011]	2012 [YR2012]	2013 [YR2013]	2014 [YR2014]
B	28119500	28572970	29021940	29465372	29901997
C	1.6	1.6	1.6	1.5	1.5
D	2.47534E+11	2.89327E+11	3.04957E+11	3.13158E+11	3.26933E+11
E	5.2	5.6	4.7	6	-
F	10.4	11.8	10	9.3	9.1
G	41.2	40.4	40.8	40.5	40.5
H	48.5	47.8	49.2	50.2	50.4
I	93.3	91.5	85.3	81.7	79.6
J	76.3	75.1	73.7	72.4	69.9

(Resources Data from database: World Development Indicators Last Updated: 11/12/2015)

A	YEAR
B	Total Population
C	Population growth (annual %),
D	GDP (current US\$),
E	GDP growth (annual %),
F	Agriculture, value added (% of GDP) Unit (0.0),
G	Industry, value added (% of GDP) Unit (0.0) ,
H	Services, etc., value added (% of GDP) Unit (0.0),
I	Exports of goods and services (% of GDP) Unit (0.0) ,
J	Imports of goods and services (% of GDP) Unit (0.0)

In addition, new physical planning guidelines were developed to improve environmental quality and conserve natural resources. Among others, these guidelines cover urban regeneration, “brownfield” development in urban areas, optimal land development, and development in catchments. Physical planning guidelines were established to ensure sustainable development. A total of 32 guidelines were issued by the TCPD, covering development of coastal areas, islands, open space, housing, retention ponds, solid waste disposal, and conservation of trees, and for environmentally sensitive areas. The main weakness in human resources is lack of expertise and knowledge in ensuring that land use planning integrates environmental aspects to the fullest potential to achieve sustainable development.

Malaysia is committed to sustainable forest management and this is reflected in the progress made on forest matters since UNCED. The National Forestry Policy was adopted in 1978 and revised in 1992, and the amendments of the National Forestry Act 1984 (amended 1993) have been accorded greater emphasis on environmental protection and conservation of biological diversity. New provisions were incorporated into the Revised Policy covering forest legislation, agro-forestry, community forestry to conservation of biological diversity, and international cooperation. In line with this country’s commitment on the Convention on Biological Diversity (CBD), the National Policy on Biological Diversity was developed in 1998 to provide the direction for the nation to implement strategies, action plans, and programmes on biological diversity for the conservation and sustainable utilisation of its resources. In Malaysia, the national forest programme is part of the national sustainable development strategy, as well as an integral component of the national integrated land management strategy.

Effective mechanisms are in place to harmonise across sectorial policies related to forests through the formation of consultative councils, such as the National Forestry Council (NFC) and the National Land Council (NCL). In the past, the focus of forest management has largely been on the management of forests for timber production, with less emphasis being given to the non-timber functions of forest management. The forests are now managed in a holistic and integrated manner to ensure a balance between development and environmental conservation. Malaysia has been establishing a network of protected areas for the conservation of biological diversity. The National Committee on Sustainable Forest Management in Malaysia was formed in early 1994 to formulate criteria, indicators, and activities required to ensure sustainable management, conservation, and development of Malaysia's forest resources, taking into account the ITTO Criteria and Indicators for Sustainable Forest Management. The Forest Departments of Peninsular Malaysia, Sabah, and Sarawak have been and are still actively involved in joint and bilateral projects with international organisations/agencies aimed at enhancing and achieving sustainable forest management.

#### **4.4 Population Growth**

Several agencies oversee the issues involved in population growth and human resource development. The Economic Planning Unit (EPU) takes a macro overview of the demographic situation, closely supported by the Department of Statistics and the National Population and Family Development Board (NPFDB) established in 1966 under the Population and Family Development Act (Revised 1988) as a statutory body. The

Malaysian government has taken steps toward the formulation of a National Plan of Action on Population and Development (NPA). This plan of action is based on the findings and recommendations of the Strategic Plan Studies on the Implementation of the National Population Policy conducted in 1992 and the 1994 International Conference on Population and Development (ICPD) Programme of Action (POA). Major target groups include the general population, families, married women in the reproductive age group (15-49 years), youth, and children (Points, 2015). The Department of Statistics publishes pertinent data on the population and growth trends occurring in Malaysia, as well as additional information on social and other programmes. Other government agencies provide publications, statistical data, and updates on activities on their respective websites to keep the public informed.

Developing a knowledge-based economy is a strategic move by the government to raise the value that can be added to all economic sectors. Besides optimising the knowledge capital of the nation, it will also provide a means to maintain sustainable economic and development growth over the long term. The transformation of the nation's economy into one knowledge-based economy will further see the development of all public universities as centres for R&D activities, especially in strategic areas such as biotechnology, biodiversity, and sustainable development. Under the Intensification of Research in Priority Areas Programme, the government provides funding for researchers in public universities in strategic areas that will sustain long-term technology development. In addition, the MOE carries out non-formal environmental education programmes through several co-curriculum projects in schools. An environmental education programme is implemented with focus on educating the society to be more

sensitive and concerned about environmental issues, knowledgeable, skilled, and committed in order to act as individuals or collectively in addressing environmental issues. Where appropriate, an educational television programme produced by the MOE has continued to give focus to the need for awareness on environmental issues. Environmental education is incorporated in the pre-service teacher education programme.

#### **4.5 Forest Degradation Issues**

Malaysia grew up after this country achieved status as an independent country in 1965. After that, it underwent continuous development in order to achieve the mission, which is to become a developed country. These developments included economic, political, and social aspects. However, Malaysia has undertaken the path of vibrant development ever since the Independence, but nevertheless Malaysia must make continuous efforts to preserve their surroundings, in terms of environmental aspects, from eradication. The main issues in the Malaysian environment include the environmental degradation issues. Since the government introduced the National Economic Policy (NEP), vulnerability towards the environment has occurred. Aggressive development efforts have been carried out because of the government's planning to achieve prosperity by engaging in indirect environmental activities.

The development under land use exploration includes agricultural activities, industrialisation activities, and socialisation activities. The agricultural activities for instance are oil palm and rubber cultivation. For industrialisation, activities include the opening of factories and new land for governmental projects. In socialisation activities,

for example, housing development and facilities, either public or private, were built to fulfil the needs of the community in Malaysia. Even though Malaysia is facing many environmental degradation problems, the government still implements many mechanisms to protect the environment. Environmental issues actually are the main issue to which any developing countries need to resolve in order to become a developed country. For instance, the development in Malaysia, such as National Economic Policy (NEP), National Development Policy (NDP) and National Vision Policy (NVP), forms the best planning and mechanism toward achieving the mission to become as a developed country.

As a measure to coordinate the efforts of the various agencies involved in controlling local sources of air pollution and to initiate remedial plans for recurring haze episodes that are most commonly associated with drought periods, a Management and Disaster Relief Committee was established in 1998. Malaysia lies entirely in the equatorial zone and is characterised by a climate that is governed by two monsoon regimes blowing alternately during the course of the year that bring substantial amounts of rainfall. Although the duration of the southwest monsoon is drier in comparison to the northeast monsoon period, the country does not suffer from prolonged drought periods. Drought conditions may occur on the rare chance of an El Nino type effect coinciding with limited rainfall. Although Malaysia is not affected by the problem of desertification, there are mechanisms and programmes in place within government agencies at both the state and federal levels to deal with emergencies related to severe drought conditions and associated problems including forest fires, diminished water supplies and food shortages.

#### **4.6 Environmental Impacts**

The Ministry of Health takes the lead role in initiating efforts to coordinate, collaborate, and resolve issues in health and the environment. The District Health Office is responsible for preventive programmes such as communicable disease control, vector control, as well as environmental sanitation. Disease control activities are also undertaken by local authorities with internal health inspectorates and play an important role in the detection and prevention of communicable diseases in urban and semi-urban areas. Concerted efforts of various agencies in health and health related agencies in both the public and private sectors have been obtained in implementing environmental health measures, such as occupational health and safety, and the Healthy City Concept.

Health promotion and disease prevention programmes continue to be accorded high priority. These activities are carried out with better integration and cooperation between the private sector and non-governmental organisations (NGOs). These programmes take into account the increasing affluence of society and its sedentary and stress-filled lifestyles. They emphasise on the promotion of a healthy lifestyle, better nutrition, proper immunisation, safe water supply, as well as food quality and safety. Environmental health and sanitation in rural areas have been provided by the Ministry of Health to supplement the coverage of safe piped water supply. Environmental health measures and activities are implemented to support sustainable development and enhance the status and quality of life of the people.

To ensure quality care and cater for the expanding health programmes, continuous training of in-service medical and health personnel is emphasised upon. The relative

shortage of trained health personnel is a constraint to the health care system. Remedial measures include increasing the intake of medical students in local universities, recruiting foreign doctors and nurses, and the reemployment of retired health personnel. Private institutions are being given permission to run twinning programmes for medical students with established medical facilities/universities overseas as well as nursing colleges. Improved service conditions for doctors and specialists are also being offered by the government.

The healthy lifestyle campaign disseminates information on incidents and prevention of contagious diseases such as human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), tuberculosis, and dengue. Health-related information is available on the Ministry of Health website ([www.moh.gov.my](http://www.moh.gov.my)) and the Ministry of Education website ([www.moe.gov.my](http://www.moe.gov.my)). The government established the Environmental Health Research Centre at IMR, and the research capacities of the National Institutes of Health (NIH) were upgraded. The IMR achieved a major breakthrough with the discovery and commercialisation of *Bacillus Thuringiensis*, a bacteria which destroys the mosquito larvae. The Public Health Institute, as a lead agency in health system research, collaborates with programme directors and universities to identify research needs in the prevention, control, and management of diseases to serve as resource to its teaching programmes for basic and advanced health courses. Local financial resources allocated for the health sector during the Eighth Malaysia Plan (2001–2005) amounted to RM5,500 million, which was 5.0 per cent of the total development allocation for the period. Funding from external aid agencies will still be required for specific training and research programmes and the purchase/hiring of specialised skills.

Malaysia continues to rely on the World Health Organisation and other international bodies for the development and improvement of various types of vaccines.

Housing and other social services continue to be a priority of Malaysia's development programmes aimed at improving the quality of life and contributing toward the formation of a caring society. The preparation of development plans (structure and local plans) has been a continuous effort by the Town and Country Planning Department. To date, structure plans for all 145 local authorities in Peninsular Malaysia have been prepared and 10 of these have been revised. With regard to local plans, 110 have been prepared and 10 more are under preparation. Though these plans differ in details, they have a common objective to ensure that the process of urbanisation occurs in the most systematic manner to have a balance between physical and human development, thus resulting in economic growth and ultimately better quality living environment.

During the period 1996-2000, 800,000 housing units were planned for construction to meet housing needs. However, a total of 859,480 units or 107.4 per cent of the target was completed. The private sector, which targeted to build 570,000 units, has completed 737, 856 units or 129.4 per cent of the target. Distribution wise, 95.3 per cent of houses in the low-cost category were completed, compared with 291.8 per cent in the medium- and high-cost category. In an effort to increase the quality of low-cost houses, new designs with a floor area of 60 square metres incorporating three bedrooms were introduced. Greater emphasis was also given to R&D in the housing sector, especially with regard to production of cheaper and more efficient building materials, better construction techniques, and life-costing estimation of multi-storey housing.

R&D activities related to production of cheaper and more efficient building materials, better construction techniques, and life-costing estimation of multi-storey housing were undertaken by the universities and the private sector. Under the Eighth Plan, the government established the Malaysian Human Settlement and Urbanisation Research Institute (MAHSURI) to conduct R&D on issues related to human settlement and urbanisation. This includes housing design and technology, especially technical research on alternative building materials as well as industrialised building systems (IBS). In addition, studies are also carried out to formulate a comprehensive policy on housing to ensure sustainable housing development.

Malaysia has experienced phenomenal economic growth in the last two decades. It has undergone a major structural transformation, moving from an agricultural-based to manufacturing-based economy with significant social changes. This rapid development has brought about significant impacts on the natural environment. Since the Independence in 1957, Malaysia has embarked on a progressive path to improve the social and economic standing of the country and its citizenry by establishing steady development and high rates of economic growth combined to significantly reduce poverty and unemployment levels, as well as address other socio-economic imbalances. The force behind these early achievements were laid out under the nation's comprehensive Outline Perspective Plans, which included detailed Five-year Malaysia Plans and strategic policy initiatives that sought to eradicate poverty, restructure society, sustain growth, and maintain national unity.

Malaysia enacted two landmark legislative initiatives to protect and maintain the environment. The first deed was the passing of the Environmental Quality Act 1974 that marked the beginning of the government's commitment to preventing pollution and degradation of natural resources. In order to ensure that environmental planning became part of development projects, the Environmental Impact Assessment was later amended to the EQA to become a valuable tool to safeguard resources and ameliorate the negative consequences of development. The National Development Policy of the Second Outline Perspective Plan (1991-2000) categorically stated that "adequate attention will be given to the protection of the environment and ecology so as to maintain the long term sustainability of the country development". Also outlined in the First Statement in Malaysia 2020 is that invaluable natural resources are not to be wasted. The Malaysian government through the Department of Environment has formulated its vision, that is, to contribute toward nation building in attaining a better level of health, safety, and quality of life through conservation and preservation efforts, prevention and control of pollution, and protection and promotion of wise use of natural resources toward sustainable development for present and future generations.

#### **4.7 Forest Management – National, Regional, and Global**

In the Malaysian economy, the economic dimension assumes significance in the conduct of the country's foreign policy. Malaysia also assumes a proactive posture in addressing the emerging regional and global issues (Points, 2015). Malaysia continues to actively participate in international cooperation in line with the strategy to promote the

realisation of greater collective self-reliance among developing countries. Efforts have been intensified toward strengthening international cooperation at the bilateral, regional, and multilateral levels, parallel with the common goal of economic development. Efforts are continuously taken to promote international cooperation at all levels to foster a more equitable global relationship where countries participate in a meaningful manner in the decision-making process on issues that affect them.

Forestry administration in Peninsular Malaysia can be divided into three levels, namely the Federal, State and district levels. There are eleven states in Peninsular Malaysia i.e. Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Pulau Pinang, and Terengganu. Each state has its own forestry department headed by the State Director of Forestry who is responsible to the Chief Minister of the state. At the state level, the State Director of Forestry is usually assisted by two Deputy Directors (Forest Development and Forest Operation) and other officers, namely Forest Management Officer and Silvicultural Officer. The District Forest Officer assisted by a deputy and several uniform field staffs' heads forestry administration at the district level. The District Forest Officers report directly to the State Director of Forestry. The state forestry department is responsible for the implementation of the forest policies of the state. At the Federal level, the Director General who is answerable to the Federal Minister of Natural Resources and Environment (NRE) heads the administration. He is assisted by two deputies and several directors. The main responsibility of the federal forestry department is to give technical advice to the state forestry departments as well as policy advice to the federal government. Professional and sub professional foresters are

appointed by the federal government and seconded to the state governments (FDPM, 2015).

National and state legal and policy instruments and related contradictions arising from different levels and actors of federal and state power and jurisdictions over land and forestry legislation and policies. Protection of each state's power over land and forest resources often results in continued contradictions with federal government's policies, regulations, enforcement, projects, etc. However, the development choices of both federal and state governments have favoured large scale projects such as commercial agriculture plantations, large dam projects, etc. Monitoring and enforcement of the many laws for land and forest protection is relatively weak, and inevitably the government role in tackling the many issues connected with deforestation is also weakened (NRE, 2011). Many of the existing land and forest laws have colonial British origins. These laws and policies are not only outdated but have over time been amended and tightened by post-independent federal and state governments steadily eroding the collective customary rights of forest peoples over their lands. Pre-existing customary land rights of forest peoples are systematically ignored and overridden, which contributed considerably to unjust land acquisition and concession allocations to commercial enterprises, at the same time failing to uphold the core standard of FPIC (Malaysia, n.d).

With regard to international cooperation on environmental and sustainable development, Malaysia continues to monitor as well as participate in international negotiations on environmental, economic, and social conditions. Participation has a twofold purpose, the first is to ensure that proposed policies and measures do not unduly impose restrictions on Malaysia's development; and the second is to ensure that there is

no discrimination against products from developing countries based on their environmental characteristics. Domestically, Malaysia continues to take the necessary steps to fulfil its Convention obligations and to ensure that its programmes and projects are in line with its commitments (Points, 2015).

In terms of financing aspects, foreign investment in Malaysia is encouraged, particularly in the area of high-end technology, non-labour intensive, and non-polluting industry and conditions have been liberalised to this end. Several fiscal and financial incentives have been announced to facilitate increased foreign investment. In terms of technical assistance, Malaysia continues to receive technical assistance from development partners (Points, 2015). However, the cooperation by Malaysia shows active participation in a number of international organisations and agreements. Efforts are continuously taken in promotion of international cooperation at all levels. Structural adjustment programmes have been implemented to broaden the economic base from resource-intensive to manufacturing and export-oriented trade. Malaysia's emphasis is both on export-oriented trade, basically centred on the electrical and electronics industries, and the development of resource-based industries, which include utilisation of wood, rubber, palm oil, cocoa, and other natural resources. These products are also targeted for the export market (Points, 2015).

The Malaysian government continuously monitors and participates in international environmental negotiations to ensure that measures proposed at these forums do not impose restrictions on Malaysia's development or discriminates against products based on their environmental characteristics. Overall, in the period 1996-2000, the Malaysian economy recorded an average GDP growth of 4.7 per cent per annum,

surpassing the revised target of 3.0 per cent. This remarkable performance of the economy, despite the severe contraction in 1998 arising from the East Asian financial crisis, has contributed to increasing prosperity for all Malaysians. The primary challenge for the Malaysian economy is now that of transforming the economy from one that is investment-driven to one that is productivity- and quality-driven, through enhancing the efficiency of labour and capital, skills upgrading, capital deepening, and improving management and entrepreneurship. Concomitant with this will be the need to accelerate the shift toward higher value-added activities that are labour saving as well as capital- and technology-intensive. Such a shift requires the strengthening of the science and technology base and enhancing research and development capability.

#### **4.8 Conclusion**

The formulation of policy on the flow and management of information pertaining to sustainable development and environment is coordinated by the Economic Planning Unit (EPU) through the Inter Agency Planning Group (IAPG) on Sustainable Development. The authority for information management is delegated to the local governments and other agencies. The Department of Statistics (DOS) has been identified as the Central Depository for Environmental Statistics in Malaysia. Besides environmental statistics, DOS also produces a wide range of economic and social statistics. There exists an Inter-Agency Committee on Environment Statistics (IACES), which identifies priorities, facilitate cooperation and supply of data, and serves as a forum to exchange/share

knowledge, experience, and expertise on issues of sustainable development indicators and environment and natural resource statistics. The DOS has completed a framework on the Development of Environment Statistics and published a Compendium of Environment Statistics (CES). The CES provides statistics on the different environmental media as well as on human settlements, together with the state of the environment, and the causes of environmental degradation.

## **CHAPTER 5: RESULTS, PRESENTATIONS, AND INTERPRETATIONS**

### **5.1 Introduction**

This chapter presents the findings and data analysis based on the established research objectives, and the results are then interpreted accordingly. There are four objectives in this study to address the problem statement for this research. The results are explained in the tables containing data, of which are sorted from documentation, and the in-depth description of data from interviews is presented. Each of the section in this chapter shows the detailed output to answer the associated research objective.

### **5.2 Forest Resource Development in Malaysia**

The relationship between forest resource development and forest degradation issues has come to the forefront in Malaysia, since environmental resources in Malaysia are generally in abundance and there is a rich variety of flora and fauna. As a developing country, Malaysia is also not an exception and has explored all the resources for economic development activities. Forest resource development in Malaysia has been looked upon as one of the important points in order to preserve environmental quality in this country. Besides, the development of forest without degradation issues seems to be not compatible with each other. For any type of economic activity which involves environmental resources, it would certainly include problematic matters, such as degradation and deforestation issues, without any permission and out of our own control. Issues about degradation often occurred many years ago, not only in Malaysia, but

covered entire parts of regional and international nations of the world. However, forest resource development and forest degradation issues had been looked upon as the main factor in the context of environmental discussions itself.

According Whitmore (1975), the tropical rain forests of Malaysia are extremely complex ecosystems and are richer in tree species than in similar areas of Africa and South America. They are, in fact, the most species rich plant communities known anywhere in the world and have evolved over millions of years. There are at least 15,000 species of flowering plants, of which 2,500 are tree species; 286 species of mammals; 600 species of birds; 140 species of snakes; 150 species of frogs and thousands of species of insects, many of which are still being documented. In addition, over 1,300 plant species had been identified as having potential pharmaceutical properties with some of them currently being used as traditional herbal medicine (Thang, 2009). In Peninsular Malaysia, it is estimated to contain 8,000 flowering plants, a total 2,650 species are tree species with 890 of them reaching harvestable sizes of at least 45cm diameter at breast height (Mohd Yunus, 1993; Primack & Lovejoy, 1995; Anon, 1996). Previous study by Mohd Hizamri (1993) mentioned that the shrub stratum and ground layer contain not less than 1,300 species of herbs and 70 species of ferns identified to have medicinal values.

### **5.2.1 Trend Change in Environmental Resources Development**

This section discusses the trend change in environmental resources development in Malaysia. Table 5.1 shows the relationship between total population from 1947 to 2014, and the total Gross Domestic Product (GDP) with the selected economic sector, which is

followed by Figure 5.1. The economic sector refers to the main sectors of economy such as agriculture, mining, manufacturing, and construction.

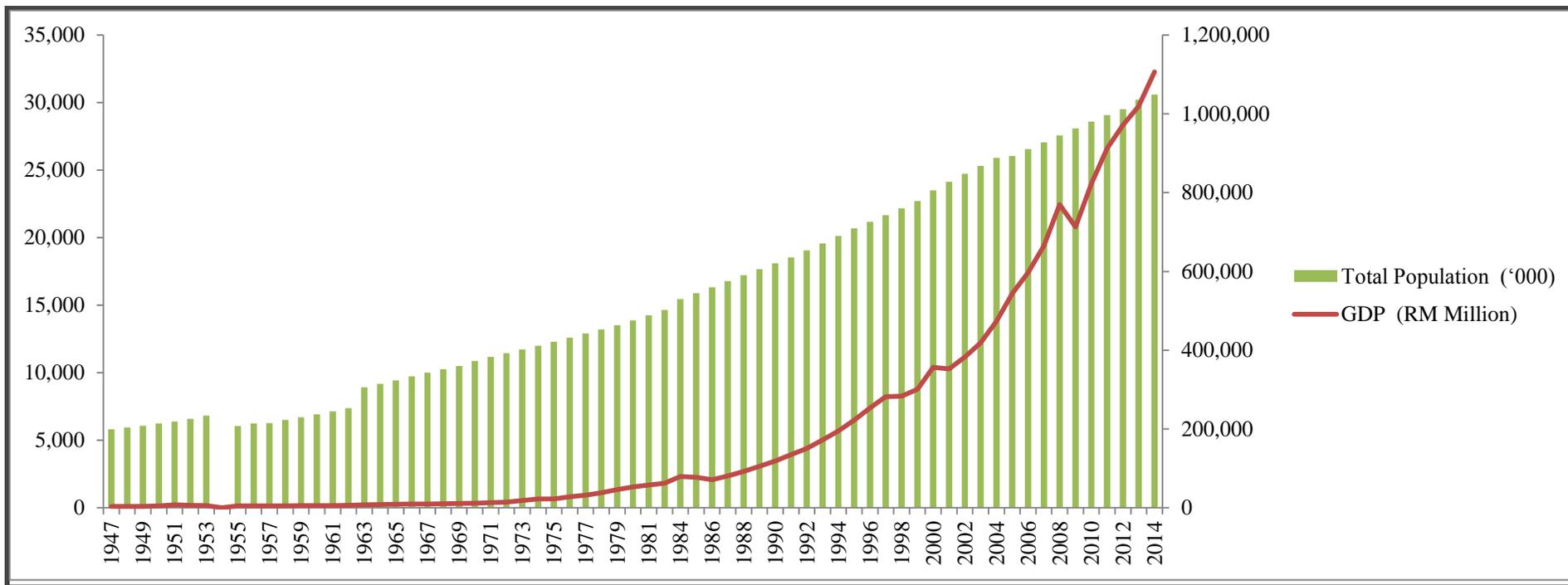
**Table 5.1: Population and GDP (Year 1947 – 2014)**

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<b>Year</b>	<b>GDP (RM Million)</b>	<b>Total Population (‘000)</b>
1947	3,531	5,820
1948	3,619	5,952
1949	3,550	6,066
1950	5,345	6,245
1951	7,520	6,382
1952	6,350	6,586
1953	5,780	6,829
1954	N.A	N.A
1955	4,992	6,058
1956	5,060	6,252
1957	5,126	6,279
1958	4,896	6,505
1959	5,527	6,703
1960	5,866	6,919
1961	5,822	7,147
1962	6,127	7,384
1963	7,684	8,920
1964	8,187	9,168
1965	9,050	9,437
1966	9,623	9,733
1967	9,762	10,007
1968	10,195	10,253
1969	11,218	10,500
1970	11,829	10,882
1971	12,955	11,160
1972	14,220	11,441
1973	18,723	11,720
1974	22,858	12,001
1975	22,332	12,300
1976	28,085	12,588
1977	32,340	12,901
1978	37,886	13,200
1979	46,424	13,518
1980	53,308	13,879
1981	57,613	14,257
1982	62,599	14,651

<b>Year</b>	<b>GDP (RM Million)</b>	<b>Total Population (‘000)</b>
1983	70,444	15048
1984	79,550	15,450
1985	77,470	15,883
1986	71,594	16,329
1987	81,085	16,774
1988	92,370	17,219
1989	105,233	17,662
1990	119,081	18,102
1991	135,124	18,547
1992	150,682	19,043
1993	172,194	19,564
1994	195,461	20,112
1995	222,473	20,689
1996	253,732	21,169
1997	281,795	21,666
1998	283,243	22,180
1999	300,764	22,714
2000	356,401	23,495
2001	352,579	24,123
2002	383,213	24,727
2003	418,769	25,320
2004	474,048	25,905
2005	543,578	26,046
2006	596,784	26,550
2007	665,340	27,058
2008	769,949	27,568
2009	712,857	28,082
2010	821,434	28,589
2011	911,733	29,062
2012	971,252	29,510
2013	1,018,821	30,214
2014	1,106,580	30,598

Source: Department of Statistics (2015); World Bank Database (2015)



Source: Department of Statistics (2015); World Bank Database (2015)

**Figure 5.1: Trend for total population and GDP in Malaysia before and after independence.**

The Figure 5.1 describes the relationship between total population and Gross Domestic Product (GDP) in Malaysia to be in an increasing trend, namely the increase in growth of total population in a particular year is reflected in the growth in consumption of environmental resources. The enhancement of population would add to the demand of consumption in the economic sector, which would lead to expansion and consumption of environmental resources.

The figure also describes about the change in GDP throughout the different stages of economic development. The Malaysian economy was observed to have a steady increasing trend since 1971 until 1984, after that it decreased slowly until 1986, and increased at a steeper gradient until 1997. Then there was a slight downward trend because of the economic crisis occurring at that time. The following years showed the economy to generally rise until the present at a steeper rate than previous years, but it still had several decreasing trends at certain times (e.g., 2000 and 2008) that lasted not more than two to three years.

Table 5.2 refers to the information about Gross Domestic Product (GDP) and total environmental resource development, focusing on main economic sectors such as agriculture, livestock, forestry and fishing, mining, and quarrying, manufacturing, and construction. The table also includes the total percentage of every sector. Nevertheless, the table is not complete in order to explain more about the exact numbers since there are places marked with not available (N.A.) due to lack of information and some obstacles in getting the fixed number of figures for certain years.

Figure 5.2 shows the timeline of trend change of environmental resource development in Malaysia, as reflected in the contribution toward the GDP. The timeline describes the trend changes of environmental resource development before the Independence and after the Independence. From this point of view, a difference can be observed in the environmental resource development trend changes between the phases. Through visual analysis, there were five identified phases of development which are labelled as Colonial Times, Pre-National Economic Plan (PRE-NEP), National Economic Plan (NEP), National Development Plan (NDP), and National Vision Plan (NVP). Each development plan shows the development planning in Malaysia, which is illustrated through the GDP. However, the data related to environmental resource development could only be found from 1960 to 2014, based on the development of each sector.

The figure also noted that mining first started to contribute toward the Malaysian economy since before Independence. However back then, the GDP only started to be recorded during the Pre-NEP, namely since 1960. Agriculture was the sector which contributed early to development of the economy. This was followed by the construction and manufacturing sectors. These three main economic sectors are representative of environmental resource development in Malaysia where the main resource consumption in Malaysia comes from land and energy sources. This is evidenced by the economic activities of these sectors that are dominated by these resources. Also, environmental resource development in Malaysia was still being controlled based on the development planning stated for every phase of development, according to the related development plans.

**Table 5.2: GDP and Environmental Resource Development (Main Economic Sectors)**

Year	GDP RM(Million)	Agriculture, Livestock, Forestry and Fishing RM(Million)	Agriculture, Livestock, Forestry and Fishing Growth (%)	Mining and Quarrying RM(Million)	Mining and Quarrying Growth (%)	Manufacturing RM(Million)	Manufacturing Growth (%)	Construction RM(Million)	Construction Growth (%)
1947	3,531	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1948	3,619	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1949	3,550	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1950	5,345	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1951	7,520	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1952	6,350	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1953	5,780	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1954	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1955	4,992	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1956	5,060	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1957	5,126	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A

1958	4,896	N.A							
1959	5,527	N.A							
1960	5,866	N.A							
1961	5,822	N.A							
1962	6,127	N.A							
1963	7,684	N.A							
1964	8,187	N.A							
1965	9,050	N.A							
1966	9,623	N.A							
1967	9,762	N.A							
1968	10,195	N.A							
1969	11,218	N.A							
1970	11,829	N.A							
1971	12,955	N.A							
1972	14,220	N.A							
1973	18,723	N.A							
1974	22,858	N.A							
1975	22,332	N.A							

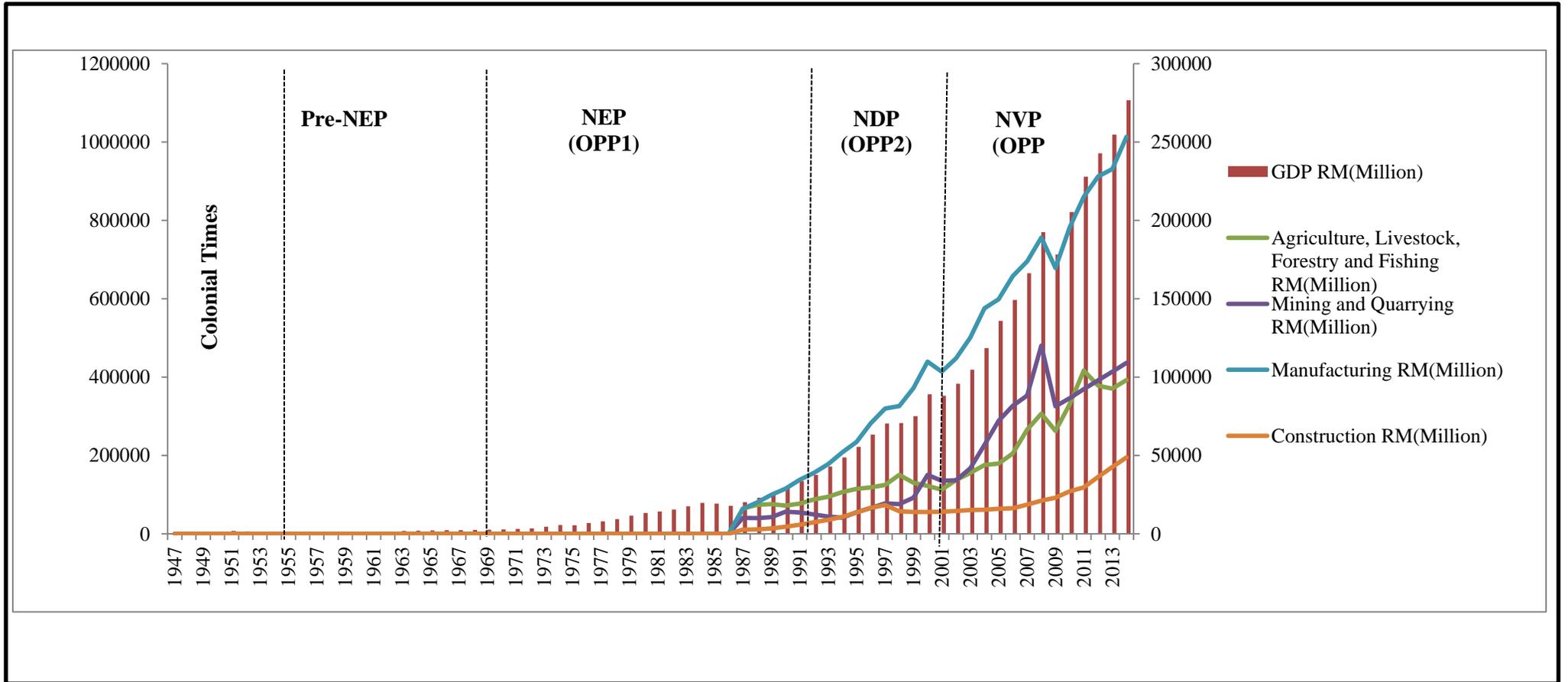
1976	28,085	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1977	32,340	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1978	37,886	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1979	46,424	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1980	53,308	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1981	57,613	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1982	62,599	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1983	70,444	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1984	79,550	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1985	77,470	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1986	71,594	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A
1987	81,085	16,185	161.85	10,235	102	16,058	161	2,818	28.18
1988	92,370	18,540	185.4	10,107	101	20,157	202	2,866	28.66
1989	105,233	19,028	190.28	10,796	108	25,048	250	3,475	34.75
1990	119,081	18,120	181.2	14,111	141	28,847	288	4,649	46.49
1991	135,124	19,398	193.98	13,725	137	34,524	345	5,939	59.39
1992	150,682	21,958	219.58	12,399	124	38,910	389	7,396	73.96
1993	172,194	23,741	237.41	11,037	110	44,643	446	9,054	90.54

1994	195,461	26,702	267.02	10,426	104	52,072	521	10,909	109.09
1995	222,473	28,809	288.09	13,864	139	58,684	587	13,747	137.47
1996	253,732	29,637	296.37	16,598	166	70,646	706	16,641	166.41
1997	281,795	31,283	312.83	19,432	194	79,974	800	18,474	184.74
1998	283,243	37,706	377.06	19,055	191	81,525	815	14,507	145.07
1999	300,764	32,610	326.1	23,081	231	93,045	930	13,987	139.87
2000	356,401	30,647	306.47	37,617	376	109,998	1,100	13,971	139.71
2001	352,579	28,245	282.45	33,945	339	103,434	1,034	14,241	142.41
2002	383,213	34,432	344.32	34,169	342	112,076	1,121	14,673	146.73
2003	418,769	38,971	389.71	41,918	419	125,332	1,253	15,200	152
2004	474,048	43,949	439.49	56,881	569	144,007	1,440	15,458	154.58
2005	543,578	44,912	449.12	72,111	721	149,754	1,498	16,107	161.07
2006	596,784	51,383	513.83	81,759	818	164,510	1,645	16,451	164.51
2007	665,340	66,446	664.46	88,332	883	173,804	1,738	18,739	187.39
2008	769,949	76,753	767.53	120,170	1,202	189,105	1,891	21,156	211.56
2009	712,857	65,719	657.19	81,342	813	169,661	1,697	23,187	231.87
2010	821,434	82,614	826.14	86,628	866	195,533	1,955	27,112	271.12
2011	911,733	104,301	1043.01	92,355	924	215,125	2,151	29,648	296.48

2012	971,252	94,632	946.32	97,987	980	228,141	2,281	36,362	363.62
2013	1,018,821	92,754	927.54	103,484	1,035	232,720	2,327	42,764	427.64
2014	1,106,580	98,150	981.5	109,123	1,091	253,392	2,533	48,741	487.41

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(Source: Department of Statistics, 2015)



(Source: Department of Statistics, 2015)

**Figure 5.2: Timeline for Environmental Resources Development in Malaysia**

## 5.2.2 Forest Resources Development in Malaysia

This section describes the forest resource development in the context of resources of forests in Malaysia. Table 5.2 below shows the information of total hectares of forest in Malaysia from 1947 to 2014.

**Table 5.3: Total Forest Area in Malaysia**

<b>Year</b>	<b>Forest Area (‘000) Million Hectares</b>
1947	7,222
1948	17,136
1949	17,098
1950	16,978
1951	16,939
1952	16,937
1953	16,874
1954	16,903
1955	16,778
1956	16,450
1957	16,104
1958	16,061
1959	16,080
1960	15,915
1961	15,414
1962	15,263
1963	12,180
1964	15,065
1965	14,992
1966	14,538
1967	14,553
1968	14,428
1969	14,395
1970	14,369
1971	14,235

<b>1972</b>	13,947
<b>1973</b>	13,810
<b>1974</b>	13,679
<b>1975</b>	12,828
<b>1976</b>	12,737
<b>1977</b>	12,485
<b>1978</b>	12,276
<b>1979</b>	11,802
<b>1980</b>	11,717
<b>1981</b>	11,306
<b>1982</b>	11,200
<b>1983</b>	11,268
<b>1984</b>	11,118
<b>1985</b>	11,130
<b>1986</b>	11,192
<b>1987</b>	19,794
<b>1988</b>	19,707
<b>1989</b>	19,706
<b>1990</b>	19,618
<b>1991</b>	19,441
<b>1992</b>	19,296
<b>1993</b>	19,169
<b>1994</b>	18,974
<b>1995</b>	18,903
<b>1996</b>	18,785
<b>1997</b>	18,794
<b>1998</b>	18,702
<b>1999</b>	18,716
<b>2000</b>	18,699
<b>2001</b>	18,459
<b>2002</b>	18,411
<b>2003</b>	18,380
<b>2004</b>	18,338
<b>2005</b>	18,313
<b>2006</b>	18,304
<b>2007</b>	18,226
<b>2008</b>	18,209
<b>2009</b>	18,244
<b>2010</b>	18,261
<b>2011</b>	18,148
<b>2012</b>	18,092
<b>2013</b>	18,124
<b>2014p</b>	18,089

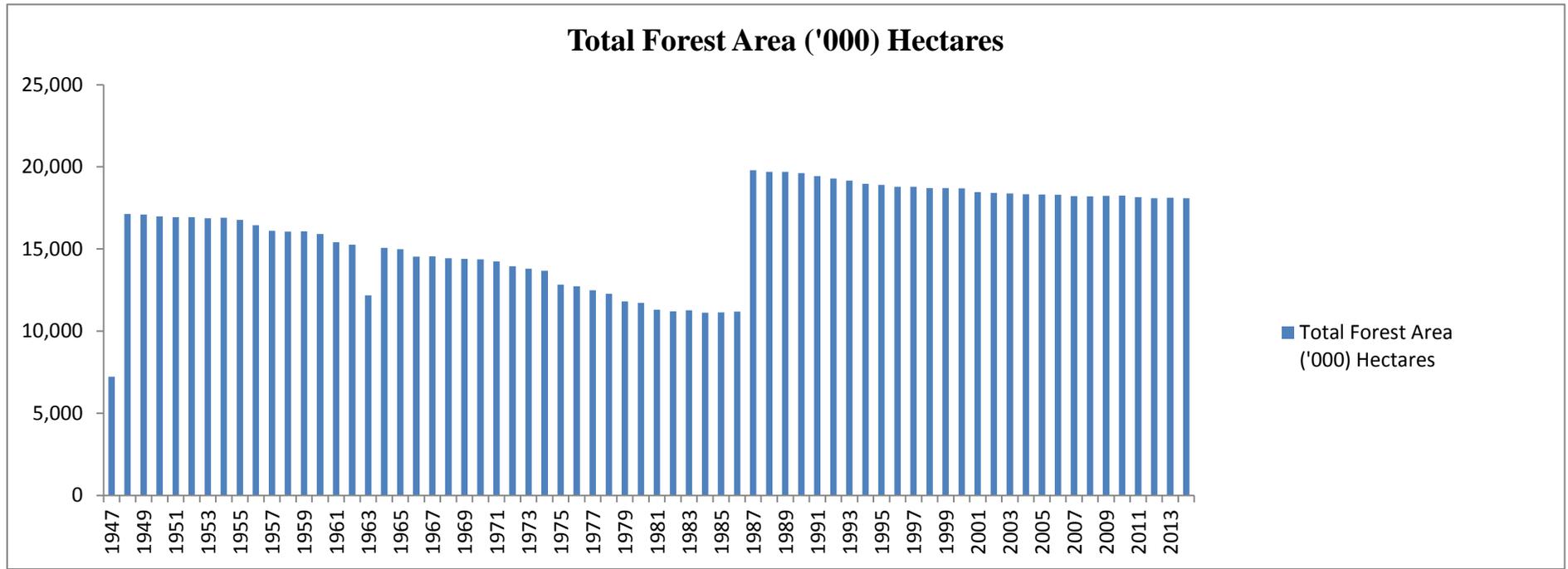
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(Source: Department of Statistics, 2015; World Bank Database, 2015)

Table 5.2 and Figure 5.3 present the information about total forest area in Malaysia, as recorded in the latest update in 2015 by the Department of Statistics and also reported by the World Bank Database in 2015 as well. The information shows that Malaysia had land use changes in terms of the forest areas. From the data point of view, the changes of forest areas occurred every year, and this occurred because of certain circumstances and changes in topography. Nevertheless, the different forest types would show different changes.

From the data, the high number of changes occurred during from 1986 to 1987 where the number of hectares increased from 11,192 to 19,794 hectares. The changes were caused when the National Economic Planning (NEP) was implemented during that time. The exploration of land use for agriculture had increased the demand of land areas. Forest areas also were utilised by the agriculture planning, where most of the land use for agriculture was palm oil production.

Besides agricultural activities, the forest areas were also involved in planned development activities, such as tin-mining, housing, industrial areas, new areas of development, and some generation of raw material products, like logs, sawn timber, plywood, and mouldings. Table 5.3 shows some information related to forests in Malaysia and the production output of these forests.



(Source: Department of Statistics, 2015; World Bank Database, 2015)

**Figure 5.3: Total Forest Area in Malaysia (1947-2014)**

**Table 5.4: Forest Information in Malaysia**

<b>Information</b>	<b>Million Hectares (ha)</b>
Land Area Of Peninsular Malaysia	13.18
Forested Area	5.80
Non-Forested Area	7.38
Permanent Reserved Forest	4.93
Inland Forest	4.18
Peat Swamp Forests	0.25
Mangroves	0.11
Plantation Forest	0.39
Percentage of Forested Area	85.02
State land Forest	0.28
National and Wildlife Parks	0.59
Protection Forest	1.92
Production Forests	3.02

<b>Production</b>	<b>Million cubic metres (m3)</b>
Logs	4.11
Sawn Timber	2.46
Plywood	0.38
Mouldings	0.10

(Source: Department of Statistics, 2016)

Meanwhile, data gathered from Department of Statistics Malaysia in 2016 stated the total forest area in Malaysia from 1990 to 2014. Among of them are the information relating to permanent reserve forest, state land forest, protected areas, and total forested area (Table 5.3). Each of the different kinds of forest had their own valuable resources. The unique combination of climate, geological, and geographical history has given rise to highly diverse ecosystems, in particular forest ecosystems. Malaysia is extremely rich in plant and animal species due to a wide variety of natural terrestrial and aquatic habitats.

Based the data presented in the table, it can be clearly observed that Malaysia had planned for their forest resources. The areas of permanent reserve forest showed that the total number basically remained slightly the same from 1990 to 2014. The changes occurred in a small scale. However, the trend is different with the state land forest. From 1990 to 2013, it can be observed that in general, the number of million hectares of state land forest showed a decreasing trend of forested areas, with a small increase in 2014.

Furthermore, for protected areas, the table showed a small increasing size trend. The size increased in relation to the Malaysia development plans during a certain time period. Besides, this occurred because of the law and regulations established by the Malaysian government during that time. The total forested area of protected land in Malaysia was shown to have remained generally steady from 1990 to 2014.

**Table 5.5: Total Forested Areas in Malaysia (1990-2014)**

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<u>Year</u>	<u>Permanent Reserve Forest (mil ha)</u>	<u>State land Forest(mil ha)</u>	<u>Protected Areas(mil ha)</u>	<u>Total Forested Area (mil ha)</u>
1990	12.49	5.23	1.06	18.78
1991	12.55	5.03	1.13	18.71
1992	12.50	4.96	1.13	18.59
1993	12.46	4.98	1.13	18.57
1994	12.65	4.19	1.13	17.97
1995	12.61	4.22	1.13	17.96
1996	14.28	1.99	1.83	18.10
1997	14.33	2.31	1.83	18.47
1998	14.33	2.24	1.83	18.40
1999	14.45	2.16	1.83	18.44
2000	14.43	1.94	1.83	18.20
2001	14.44	1.83	1.83	18.10
2002	14.43	1.78	1.83	18.04
2003	14.42	1.77	1.83	18.02
2004	14.40	1.74	1.83	17.97
2005	14.43	1.52	1.86	17.81
2006	14.45	1.48	1.86	17.79
2007	14.42	1.43	1.86	17.71
2008	14.41	1.41	1.86	17.68
2009	14.54	1.32	1.86	17.71
2010	14.53	1.55	1.86	17.93
2011	14.52	1.55	1.86	17.93
2012	14.50	1.55	1.86	18.01
2013	14.55	1.65	1.86	18.06
2014	14.55	1.86	1.86	18.27

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(Source: Department of Statistics, 2016)

### **5.2.3 Forest Degradation Issues Associated with the Trend Change in Forest Resources Development**

This section explains the forest degradation issues which are associated with the trend change in environmental forest resource development in Malaysia. Data for forest degradation issues were gathered from interviews and the opinions from selected expertise cohorts. The forest degradation issues can be divided according to four main components in the environment, namely land, water, air, and ecology. The data were collected from two sources, which are primary data via interviews, and secondary data collected from documents.

The data extracted from documents are shown in Table 5.5. The information about forest degradation issues was extracted from reports related to the Malaysian development planning. Each piece of information is put into the appropriate column. The data for forest degradation issues were also supported with interview data to strengthen the proof of issues occurring at that time. The findings showed that the data tallied between the two resources.

Additionally, forest degradation issues data were obtained from interviewing the five cohorts of interviewees. Each cohort is represented by two experts. The total forest degradation issues that occurred during each the phase of development was noted by them. The increasing total forest degradation issues occurred in every year through the increase of economic development activities. The degradation issues usually happened simultaneously in the four main environmental components.

**Table 5.6: Forest Degradation Issues in Malaysian Planning (MP1-MP10)**

<b>Malaysian Development Plan</b>	<b>Forest Degradation Issues</b>
MP1	<ul style="list-style-type: none"> <li>• Land and forest resources.</li> <li>• During this time, potentially productive agricultural lands existed in large quantities.</li> <li>• Besides, the extent of paddy acreage under double-cropping expanded through drainage and irrigation projects enabled single-crop paddy cultivators to rise above the poverty line.</li> <li>• Increase employment in mining, manufacturing, and construction and the share of other Malaysians in agriculture and services so that by 1990 employment in the various sectors of the economy will reflect the racial composition of the country.</li> <li>• Water pollution is a more widespread and serious problem. The major sources of pollutants in inland waters were sewerage and domestic waste waters from populated areas; effluent discharges from agro-industries, particularly palm oil and rubber processing factories, industrial effluents, silt from mining ponds, land clearing for urban and highway development, and the use of agricultural chemicals, including both pesticides and fertilisers.</li> <li>• In coastal areas, port activities and rapidly expanded waterfront industries, including the establishment of major naval facilities and shipyards, were sources of pollution which significantly affected inshore fisheries.</li> <li>• Renewable resources were actively utilised, while enactments dealt with the use and exploitation of natural resources as well as the use of sound cultivation, cropping, and conservation techniques had in general resulted in minimal impairment of the potential of these resources.</li> </ul>
MP2	<ul style="list-style-type: none"> <li>• Pollution is most common in agricultural land, where increased efforts to raise productivity are the principal source of pollution. Pollutants in these cases included the whole range of fertilisers, pesticides, herbicides, and the gaseous by-products of industrial processes.</li> <li>• It was caused by spoliation of land by tin mining, by increasing deforestation for agricultural expansion, by careless land development, by increasing industrial sewerage and domestic wastes, by growing use of agricultural fertilisers and pesticides, and by increasing use of estuarine and coastal waters for transport and recreation.</li> </ul>
MP3 & MP4	<ul style="list-style-type: none"> <li>• Mining, new agricultural settlement, replanting of existing lands, logging and urban and general infrastructure development.</li> <li>• A large proportion of the population lived in valleys and river basins which are flood-prone.</li> <li>• Industrialisation in Malaysia was achieved at that time without serious and far-reaching environmental problems.</li> <li>• Heavy industries including chemical plants, thermal power stations and petroleum refineries were not concentrated in any one area with the result that they had not been a major source of pollution.</li> </ul>

	<ul style="list-style-type: none"> <li>• Dust and fumes from quarries and cement plants, the incineration of waste and fumes from traffic in dense urban areas were the most serious source of air pollution. They sometimes reached levels hazardous to health.</li> <li>• Noise pollution was a problem that can be contained by enforcement of industrial and health regulations. Noise and visual pollution in the general environment were increasingly serious problems. Effective town and country planning had an important role to play in this respect.</li> <li>• Sewerage and domestic waste waters from populated areas, effluent discharges from agro-industries, particularly palm oil and rubber processing factories, industrial effluents, silt from mining ponds, land clearing for urban and highway development, and the use of agricultural chemicals, including both pesticides and fertilisers.</li> <li>• In coastal areas, port activities and rapidly expanding waterfront industries, including the establishment of major naval facilities and shipyards, were sources of pollution which significantly affected inshore fisheries.</li> <li>• The loss of genetic materials contained in the thousands of species of organisms living in the forests which were of potential importance for plant breeding and in control of pests, and disease in agriculture and forestry also required attention.</li> <li>• The preservation of representative samples of Malaysia's natural forest ecosystems with its constituent flora and fauna was therefore particularly important.</li> </ul>
MP5	<ul style="list-style-type: none"> <li>• Land use and soil conservation. The control of runoffs from newly developed land for agriculture, housing, industry, roads, highways, and other infrastructural development was undertaken more on ad hoc basis.</li> <li>• Land use. More than 35 per cent of the land in Peninsular Malaysia was developed for agriculture, mining, urbanisation, and infrastructure.</li> <li>• Treatment of polluting effluent and the recovery of other waste matters as energy in the form of biogas and electricity as well as animal feed.</li> <li>• Air conservation was related to control of industrial emissions. The problems of air pollution were controlled largely through the enforcement of the Environmental Quality (Clean Air) Regulations, 1978. By October 1984, 31 factories were charged in court for various offences under the Clean Air Regulations.</li> <li>• Noise control. A National Noise Control Committee was established to study and monitor all aspects of the problem. Appropriate regulations for noise control were formulated. Noise monitoring was also conducted in various towns to determine typical noise levels experienced by the public due to industrial operations, construction activities, motor traffic, and aircraft landings.</li> <li>• Water pollution control of agro-based industries. Both the palm oil and rubber processing industries continued to be regulated under the respective Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977 and the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978.</li> <li>• In both palm oil and rubber processing industries, the concurrent R&amp;D efforts by the private sector played a significant part in</li> </ul>

	<p>evolving the indigenous development of treatment technology for palm oil wastes and rubber effluents.</p> <ul style="list-style-type: none"> <li>• Mining. The department of mines took further steps to control the discharge and runoffs from tin-mining areas, largely through the enforcement of the various state mining enactments and rules.</li> <li>• The disposal of toxic and hazardous waste onto land, that eventually affected the quality of groundwater resources, had yet to be properly regulated and controlled.</li> <li>• Solid waste disposal. There was also a significant increase in the percentage of water being disposed of by incineration rather than by open burning.</li> <li>• Marine environmental protection in relation to control of land-based sources. Most pollutants, including oil from land-based sources, were largely controlled by the enforcement of various regulations under the Environmental Quality Act, 1974.</li> <li>• Nature conservation of terrestrial parks and reserves. The preservation of representative areas of natural forest and marine ecosystems with its constituent flora and fauna continued to be accorded due importance.</li> </ul>
MP6	<ul style="list-style-type: none"> <li>• Industrial land clearing, unregulated development, mining, and logging activities in the catchment areas were responsible for sedimentation and siltation problems.</li> <li>• Sewage contamination mainly from both domestic and animal wastes, as indicated by faecal coliforms, found in Pahang, Perak, Penang, and Sarawak.</li> <li>• Air quality. During the period 1986-1990, air quality in terms of total suspended particulates (TSP) monitored in the commercial and industrial areas improved while the levels of particulates increased slightly in the residential and vehicular traffic areas.</li> <li>• Air pollution was estimated to have increased by 6 per cent during the Fifth Plan period. The largest contributor to air pollution was motor vehicles which registered rapid increase during the period. The Motor Vehicle (Control of Smoke and Gas Emission) Rules, 1977, regulated the emission of black smoke from diesel-powered motor vehicles.</li> <li>• The open burning of industrial wastes, particularly in wood-based and rubber-based factories, remained a major problem. ... open burning of wastes at local authority dumping grounds was also found to be a problem.</li> <li>• Pollution from oil spills. During the Fifth Malaysia Plan period, more sightings of oil spills were reported from oil platforms.</li> <li>• Noise pollution. Control of noise pollution from motor vehicles was carried out under the Environmental Quality (Motor Vehicles Noise) Regulations, 1987. However, enforcement initially was focused on noise pollution from motorcycles.</li> <li>• A number of river estuaries in the states of Johor, Kedah, Kelantan, Perak, Penang, Selangor, and Terengganu were also contaminated. This was due to high population density, unorganised disposal of human wastes in squatter areas, increased urbanisation, and prevalence of dense settlements along the coast with the lack of adequate facilities for sewage treatment.</li> <li>• Water Pollution. Industrial sources of water pollution continued to be concentrated on the west coast of Peninsular Malaysia, with Johor, Penang, and Selangor accounting for almost 50 per cent.</li> </ul>

	<ul style="list-style-type: none"> <li>• Pollution from non-industrial waste, the most significant contributor of organic pollution in inland waters, showed little improvement during the Fifth Plan period. Sewage remained the main contributor to organic pollution accounting for three times the combined load discharged from industries and animal husbandry.</li> <li>• Pollution load from sewage continued to increase due to greater urbanisation and inadequate sewerage facilities, as only 5 per cent of the urban population benefited from centralised sewerage facilities</li> <li>• Marine pollution. To further control waste discharges from land based sources to the marine environment, the amendment to the Environment Quality Act, 1974, that came into effect on 9 January 1986, prohibited the discharge and spillage of oil and wastes into Malaysian waters, unless licensed. As for the control of pollution from sea-based sources, the Merchant Shipping Ordinance (MSO), 1952, controlled the discharge of oil and harmful substances from ships.</li> </ul>
MP7	<ul style="list-style-type: none"> <li>• Land Resources. To address the negative impact of land development such as erosion and landslips, the Town and Country Planning Act, 1976 was amended in 1994.</li> <li>• The screening and approval of development plans at the State Level were given emphasis through the setting up of State Planning Committees which provided a channel for the coordination and proper management of natural resources.</li> <li>• The three main sources of air pollution were mobile sources (vehicles), stationary sources (power stations, industrial fuel burning processes, and domestic fuel burning), and the burning of municipal and industrial wastes.</li> <li>• The meteorological stations recorded an increase in atmospheric acidification.</li> <li>• Trans-boundary atmospheric pollution contributed to serious haze problem in 1991, 1992, and 1994.</li> <li>• Black smoke emission from diesel-powered vehicles.</li> <li>• Open burning of waste, effluent discharges, illegal disposal of toxic and hazardous waste, and marine pollution.</li> <li>• Sewage contributed 65 per cent of water pollution in terms of BOD, while agriculture and industry accounted for 27 per cent and 8 per cent respectively.</li> <li>• Highland development and land clearing activities also resulted in an increase in suspended solids and changes in the morphological characteristics of rivers. These activities contributed to increased flooding as well as pollution of coastal and marine areas.</li> <li>• Unsafe solid waste landfills and illegal dumping of waste remained a problem, as enforcement was hampered by the lack of capacity and legal power of local authorities.</li> <li>• Hazardous substances and waste.</li> <li>• Oil spill incidents.</li> </ul>
MP8	<ul style="list-style-type: none"> <li>• The three main sources of air pollution were mobile sources, namely vehicles and stationary sources such as factories and thermal-power generation plants as well as the burning of municipal and industrial wastes.</li> <li>• The main sources of river water pollution were from the discharge of domestic sewage, manufacturing, pig farming, agricultural</li> </ul>

	production, and land clearing and earthworks.
MP9	<ul style="list-style-type: none"> <li>• The pesticides Act 1974 was revised in September 2004 to strengthen the control of pesticides through the introduction of safer handling measures, penalties for non-compliance with safety labels and promotion of safety features in production and sale.</li> <li>• Land use planning. A National Physical Planning Council was established in 2003 and a National Physical Plan (NPP) 2000-2010 was adopted to further enhance integrated land use planning.</li> <li>• Guidelines to protect and conserve Environmentally Sensitive Area (ESA) were developed.</li> <li>• Air Quality deterioration in the Klang Valley, Selangor, and Seberang Perai due to increased concentration of ambient ozone levels and particulate matter from vehicles, industries, and open burning activities and sulphur dioxide from industrial activities.</li> <li>• Measures were also undertaken to reduce the occurrence of haze from domestic sources, with the enactment of the Environmental Quality Regulation (Declared Activities) (Open Burning) in 2003.</li> <li>• Flood mitigation: continuous efforts were undertaken to reduce flood hazards in the Klang Valley as well as other flood prone areas throughout the country with the implementation of both structural measures.</li> <li>• Floodplain management and the implementation of the “Manual Saliran Mesra Alam” (MSMA) for Malaysia, a control of water at source approach that also addresses erosion and siltation problems.</li> <li>• Biodiversity: The National Biodiversity-Biotechnology Council (NBBC) was established in 2001 to coordinate efforts for the conservation and sustainable utilisation of biological resources.</li> <li>• The National Wetlands Policy was adopted to conserve wetlands as well as improve their management.</li> <li>• The Malaysian Criteria, Indicators, Activities and Standards of Performance for Forest Management Certification (MC&amp;I) system was launched in 2001 to certify sustainably managed forests and chain-of-custody timber produced from these forests and 67 companies were certified by 2005.</li> </ul>
MP10	<ul style="list-style-type: none"> <li>• The government continued efforts to enhance the efficiency and effectiveness of solid waste management, which also lead to the reduction of GHGs emission.</li> <li>• A holistic management of solid waste through sanitary landfills would recover the methane produced from waste and use it to generate energy. The government further enhanced public awareness on the importance of reducing, reusing, and recycling of waste.</li> <li>• The implementation of the Clean Air Action Plan was intensified. Efforts would be directed toward five focus areas: <ul style="list-style-type: none"> <li>- Reducing emissions from motor vehicles.</li> <li>- Preventing haze pollution from land and forest fires.</li> <li>- Reducing emissions from industries.</li> <li>- Building institutional capacity and capabilities.</li> <li>- Strengthening public awareness and participation.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"><li>• In the area of coastal and marine protection, the integration of the Coastal Zone Physical Plan into the NPP allowed improved management and protection of the shoreline, including efforts to intensify mangrove planting.</li><li>• The availability of comprehensive data was required to support conservation efforts. Various agencies and departments managed individual biodiversity databases. During the plan period, efforts were implemented to link and integrate existing biodiversity inventory and databases, with a view to develop a comprehensive one-stop database in the future.</li><li>• Deforestation was considered as the second most important human-induced source of GHGs and was responsible for approximately 20% of total global emissions.</li><li>• Malaysia has long practised sustainable forest management in utilising its resources, and at the same time, ensured these forests continue to function as carbon sinks.</li><li>• The government with participation from the private sector, non-government organisations (NGOs), and the public at large continued efforts in planting more trees to green the country.</li><li>• Enhancing conservation of Nation's Ecological assets such as enhancing forest and wildlife conservation efforts and ensuring sustainable and safe utilisation of resources.</li><li>• Between 2010 and 2012 alone Malaysia lost 4.72 million ha of forests.</li></ul>
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Table 5.5 above shows the forest degradation issues that occurred from MP1 to MP10. The data were collected based on the government annual reports for development planning. The issues about deforestation and forest degradation in Malaysia are a complex phenomenon with varying causes. So far, however, the focus is largely on direct or proximate causes like industrial logging, large-scale commercial oil palm plantations and agribusiness, road construction, and large dams. Far less attention is paid to the indirect or underlying causes and agents, inter-linking, and working to enrich the very few while creating hardships for many people as a result of degraded or diminished resources. Major agents of deforestation include commercial loggers, commercial oil palm, and other tree planters, infrastructure developers, or governmental and developmental agencies. As community forests are plundered and forests are cleared, local sustainable customary land use systems are confined to reduced areas of forest land threatening their sustainability. This has had harmful impacts on communities' access to forest resources for their livelihood and food security, consequently intensifying livelihood hardship and poverty. Beyond the immediate losses, there is also the loss of generational stories, customs, tales, legends, history, and so on, that shape and define so much of the once forest dwellers.

#### **5.2.4 Trend Change of Forest Resources in Malaysia**

Forest management has been defined as dealing with the overall administrative, economic, legal, social, technical, and scientific aspects involved with the handling of conservation and use of forests. It implies various degrees of deliberate human interventions, ranging from action aimed at safeguarding and maintaining the forest ecosystem and its functions, to favouring given socially or

economically valuable species or groups of species for the improved production of goods and environmental services (FAO, 1991).

Past records showed that in the late 19th century, Malaysia's land surface was more than 90% covered by forest. There was no significant development of forestry activities until the introduction of tin mining, followed by extensive rubber plantations in the late 19th and early 20th century. These and other factors prompted the establishment of the Forest Department for the Straits Settlements (a selection of the states now included in Peninsular Malaysia) in 1883. By 1990, a Forest Officer was appointed for the Federated Malay States (all states now included in Peninsular Malaysia except Kelantan and Terengganu). Menon (1976) reported that recommendation for the formation of a Forest Department for the Federation was brought up together with promulgation of Forest Law to enable forest reservations and preparation of the working plans for operations and forest management. The Chief Forest Officer was appointed in 1901. Similar exercises were carried out in Sabah and Sarawak which resulted in the appointment of their Forest Conservators in 1915 and 1919 respectively (Country Profile Malaysia Forestry, n.d.).

Malaysia's forests are inhabited by over 8,000 species of flowering plants (Cranbrook, 1988) of which over 2,500 are tree species (Whitmore, 1975) with an estimated 290 species reaching harvested size of at least 45 cm diameter at breast height, thus making it one of the 12 countries endowed with extensive areas of valuable natural tropical rainforest of complex ecosystems. Forest being a renewable resource has contributed significantly toward economic growth and development of Malaysia through foreign exchange earnings, Gross Domestic Product (GDP) growth, employment opportunities, government income, and forest based industries (Jusoff, 2008).

Malaysia is known for its diverse forest resource. These forest types are Ericaceous Forest, Montane Oak Forest, Highland Dipterocarp Forest, Hill Dipterocarp Forest, Lowland Dipterocarp Forest, Swamp Forest, and Mangrove Forest (Here & Enter, n.d.). Figure 5.4 shows the Google Earth mapping of forest change in Malaysia from 2000 to 2014. The different colours are representative of the year of change occurring at the time. From the map, it clearly shows the situation of forest change. The yellow colour indicates the changes occurring in 2000, while the brown colour marks the changes observed for 2001-2013. Meanwhile, the red colour represents changes in 2014. Each of these changes was caused by the development activities that are more focused on agricultural rather than those of other land usage, such as for settlements and infrastructural development. From this figure, it clearly shows the forest changes in each of the states in Malaysia.

Meanwhile, Figure 5.5 and Figure 5.6 also revealed the same information about the Google Earth mapping of forest changes in Malaysia, but with a different layout. The maps are different in terms of the presentation and information. On the one hand for Figure 5.5, the map highlights forest areas lost particularly for 2014. Referring to the blue colour, the areas of lost forest is clear and easy for the prediction of the states. On the other hand, Figure 5.6 also illustrates the same information as the Google Earth mapping of forest lost changes in Malaysia. The layout of the map focuses on the forest lost from 2000 to 2014. Even though the map seems to show the same information, the different colours of the map give more detail about the forest lost information during that period. Moreover, the different interpretation about the forest lost changes in Malaysia could offer the exact details of data information. Based on the figures below, people could detect which areas the most loss of forest would occur as compared to other areas. The data from Table 5.2 can be interpreted

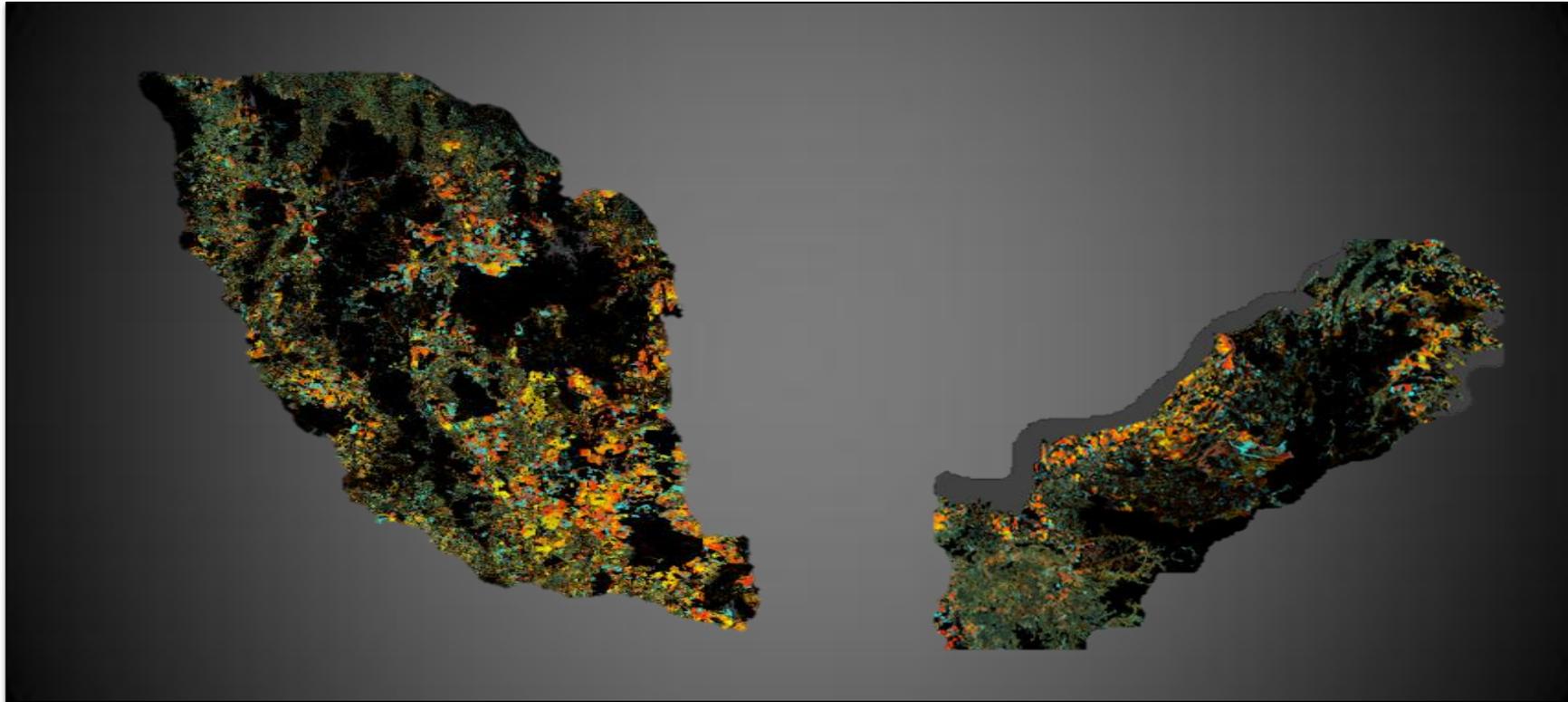
into the maps below. The changes are different in accordance with the areas and places.



	2014
	2001 -2013
	2000
	Intact Forest Landscapes

Source: Hansen, Potapov, Moore, and Hnacher et al. (2013)

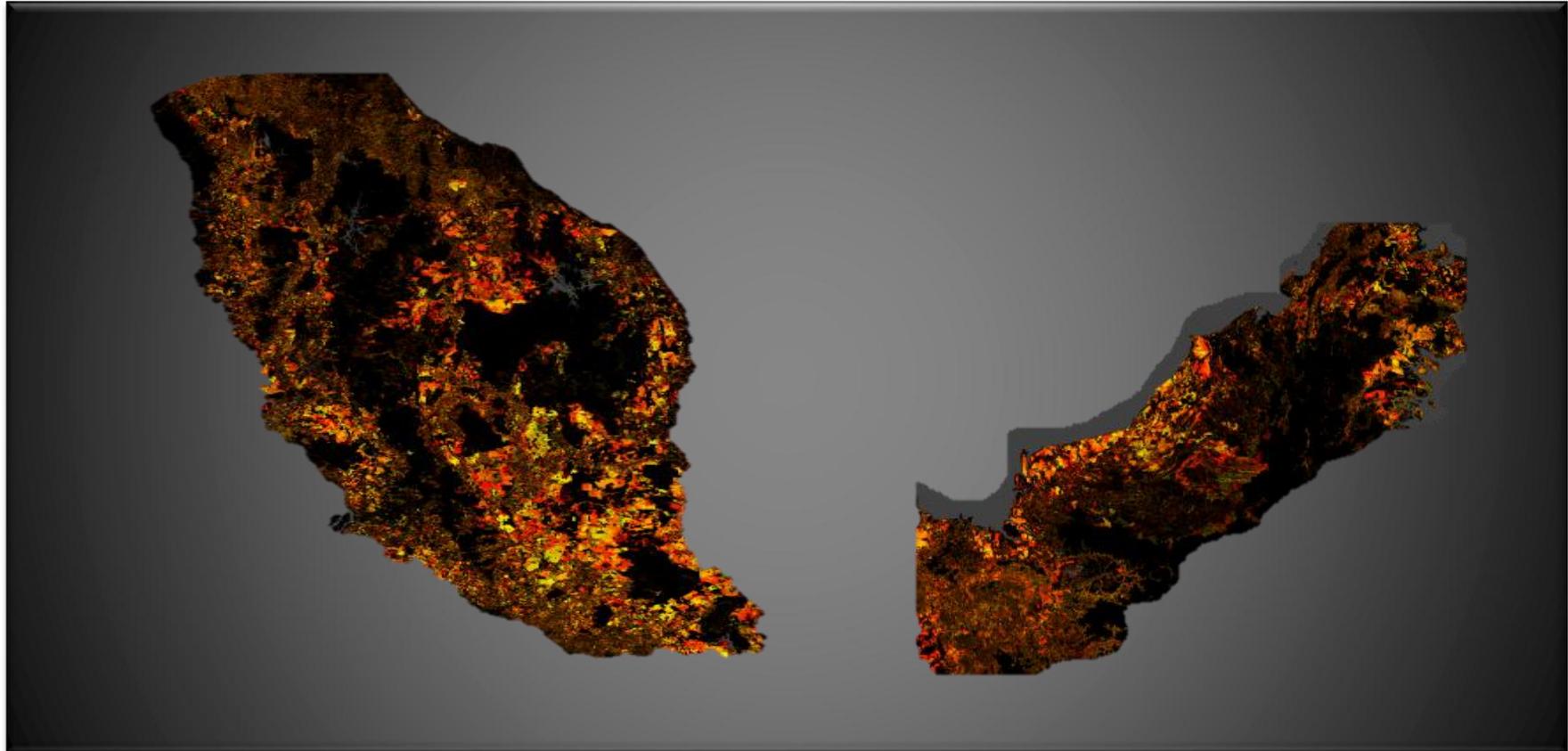
**Figure 5.4: Google Earth mapping of forest change in Malaysia (Forest Lost Year)**



	2014
	2013
	2001-2002
	2000
	No Loss

Sources: Hansen, Potapov, Moore, and Hnacher et al. (2013)

**Figure 5.5: Google Earth mapping of forest change in Malaysia (Forest Lost Year 2014 Highlight)**



	2014
	2001 -2013
	2000
	No Loss

Sources: Hansen, Potapov, Moore, and Hnacher et al. (2013)

**Figure 5.6: Google Earth mapping of forest change in Malaysia (Forest Lost Year)**

#### 5.2.4 Effects of Forest Degradation Issues on the Environment

This section discusses the trend change pattern of effects of environmental forest degradation issues on the environment. In developing the story line, the researcher referred to the Reflective Coding Matrix. All sub-categories in the matrix such as processes, properties, dimensions, contexts, and modes of understanding the consequences are essential in facilitating the researcher to explain clearly the core category. The narrative started with the *effects of environmental degradation issues*, then the *impacts of environmental degradation issues*, next; *categorisation of environmental management efforts in Malaysia*, then; *impacts on quality of life*, and finally, *sustainable development targets*. The researcher gave detailed descriptions and supporting statements from participants for all the processes. To make it easier for readers to identify codes, the researcher has italicised all codes.

Getting the information by interviews of some of the experts in their fields about the effects of forest degradation issues on the environment, one of the respondents (Academician I) stated:

*“As we know...Malaysia is one of the countries in Asia that is in line toward achieving sustainable development goals. Aaa...there are many developments occurring in Malaysia especially involving the environmental resource itself...each economic activity must influence the environment part”.*

*“When Malaysia goes through the missions toward becoming a developed country...somehow it forgot to manage wisely its resources. This would give much impacts and effects in order to achieve the missions. Aaa....there is much effect associated with the environmental degradation issues which some of them were unaware and some of them were hidden by some parties who were not responsible about those matters”*

*“So, when talking about the effects, categorisations should be put on the boxes. Aaa...among the effects are on economics, social, politics,*

*and the environment itself. And...here is a relation between the categories. When one of them failed to be in balance, the others will fail as well...this things I found from my reading and watched the issues on media or internet itself”.*

[Source: Academician 1, 2014]

This participant demonstrated the effects of forest degradation issues were basically associated with the aspects of economics, social, politics, and the environment. Meanwhile Academician II said:

*“Environmental issues in Malaysia occurred many years ago...Malaysia is one of the Asian countries which are growing up with developments. Aaa...Development covers aspects in all components in environment such as land for agricultural and industrialisation, and for replanting forestry to get a good quality air, water for fisherman activities, oil and gas industries, and...ecology like rehabilitations of ecology resources so that pollution would decrease parallel with each implementation”.*

*“So...each activity must give negative impacts on the environment...the main problem about this thing is that people do not take seriously about throwing particular things into environment”.*

*“Aaa...from observations, some of them only take the easy choice in every single thing. For instance...they are never sensitive about animals when they do the exploration of hills. They are supposed to follow the rules and regulations so that each component in the environment would be in a good condition”.*

*“The effects are more...when the environmental degradation issues occur, which is involved in every component of environment. Aaa...The rate of pollution will increase year by year, the increasing of temperature, and the issues of climate change would be static if the development activities do not monitor seriously”.*

[Source: Academician II, 2014]

The opinion between Academician I and Academician II showed the differentiation in terms of explanation. Academician II stated forest degradation issues could give negative impacts and the effects were more towards the emissions

into the environment. Both of them said the same major point, namely forest degradation issues could give an effect toward the environment.

The opinion by these academicians was more focused on their reading materials and by watching media and the Internet. But then, the effects of forest degradation issues could be different from other opinions. Researcher I said:

*“Ok...based on my experienced in environmental research, there is much effect toward environment when people are involved in any development project. Aaa...one thing is the economic part would be increased because of investment by insiders and outsiders as well”.*

*“Aaa...even though Malaysia has a many natural resources, when they do not pay serious attention, little by little the resources will finish and be destroyed”.*

*“Much research associated with the environment was done in Malaysia since it was announced as an independent nation. Aaa...most research finding showed movement in the physical environment itself. For instance...housing projects changed the figures of environment and the effects on ecology, water, and land, are also are huge. Aaa...either they are doing the projects by following each of the rules or just to ensure that their aims to expand in the areas are achieved”.*

[Source: Researcher I, 2014]

The opinion by the Researcher respondent was different from the Academicians. This participant claimed that the effects of forest degradation issues would cause landforms changes. A more in depth explanation was namely associated with having effects on ecology, water, and land. Even though the explanations were different, but the keyword revealed the same meaning of environment. Moreover, Researcher II said:

*“Ok...Environmental degradation issues occurred many years ago. Either we are concerned or not...lately in 21st century era, the degradation issues are getting more problematic for this country”.*

*“These issues actually give impacts and effects for any economic activity...Aaa...why these issues are more popular than before? It is because of the mission of this country toward becoming a developed nation, which means that Malaysia can achieve same GDP rate as*

*other developed country, which is good for infrastructure, good for services and good for manufacturing as well. All of the components we call as an economic activity”.*

*“Yaa...either we like it or not, development activities should be continuously parallel with the mission. In fact, when we fail to move toward the aims, hence this country cannot get the achievement...Aaa...the serious effects when the degradation issues occur is the physical movement of the environment. For instance, many hills were destroyed and slope failure occurred in many places. From that kind of problems, it will give effect to other problems like floods and soil infertility”.*

[Source: Researcher II, 2014]

Apparently, Researcher II had the same opinion with the Researcher I based on their experience on that matter. The statements about the effects toward the environment when the degradation occurred mostly touched upon the same ideas and the same information. To get a stronger statement, opinions from policy makers who formulated the policy about the environmental aspect are essential. Policy Maker I stated:

*“Yaa...as we know Malaysia is one of the developing countries in Asia. But Malaysia is also in line towards becoming developed country. On the government side, there are several agencies in charge of environmental perspective part. Among the ministries involved directly include NRE, DOE, KeTTHA, EPU, and MOH”.*

*“In the Ministry itself, they do their task which is making policy, doing the planning about the environment, proposing project papers and ensuring the implementation task”.*

*“Usually they make the policy parallel with the condition of people’s needs. For instance, Aaa...the increasing population would increase the basic necessities of life such as shelter, food, and clothing”.*

*“Aaa...every year government will propose a variety of development projects to meet the needs of the society; somehow the projects would give bad and good effects especially for our surroundings. Aaa...the main effects would be environmental changes, in terms of landforms and climate changes as well”.*

[Source: Policy Maker I, 2014]

Policy makers are individuals who went through the process of formulating the policy to ensure that the environment is safe and each of the development projects should follow the rules and regulation. From the statement by Policy Maker I, his opinion was more toward the effects on environment as well. Besides, Policy Maker II said:

*“Environmental degradation issues mean the effects in our environment when we make economic activities...Aaa...as a person involved in government line for achieving developed country status, there is some opinion and facts about that matter”.*

*“Every single development plan by the government should follow rules and regulations...there is no short cut for any development projects. Somehow...Aaa...there are illegal projects developed without knowing they existed. To handle development projects in Malaysia, we need to appoint several parties to monitor those things”.*

*“And...we also have a department to cater for problems of environmental degradation. Every project will come with reports for each section. The effects commonly occur when projects start. It is the clearing of land process, the losing of habitat life, pollution coming into the air and water, and then the destruction of habitat, flora, and fauna itself”.*

[Source: Policy Maker II, 2014]

These above statements generally discussed about the story of development. But then, the respondent also did mention about the effects of forest degradation issues. The effects were related to the impact on the main components of the environment. To avoid bias information from that person who really dealt with this field, the researcher had interviewed the public to get the opinion about the effects of forest degradation issues. Respondent Public I revealed:

*“Aaa the story is like this...since prior to Independence Day...the environmental degradation issues occurred slowly. However, nowadays the problems are more critical compared to many years ago...I am still alive and went through the experience about environmental conditions in Malaysia”.*

*“Many years ago, people could breathe fresh air when waking up early in the morning, Aaa...but now the situations is more different*

*because every morning we face air pollution coming from factories, vehicles and any development project...besides, open burning also one factor contributing toward those particular matters”.*

*“The effects of environmental degradation is because they could not see the green in Malaysia, does not matter in any states. This is because each state makes changes and transformation toward making developed areas...Aaa...Only a little space they reserve for recreation activities and for tourism attractions...the rest we just can see buildings and a variety of new infrastructure laa”.*

*“Besides, the original landforms also were destroyed and we could not see the real one...all roads already transformed into good quality ones...this development is good but we should also preserve the original one without making more changes”.*

[Source: Public I, 2014]

The participant had mentioned about the situation of degradation issues in Malaysia. The effects actually occurred many years ago, but it was a matter of the people either noticing or otherwise about these issues. The participant also had the same opinion with the other respondents described above, namely regarding the landform changes associated with the environmental aspect as well. Moreover, participant Public II stated:

*“Environment is one of the indicators for humans to get good quality of life. Without a very good quality environment, we would not live with comfort and peace...Since many years ago Malaysia was transformed toward development. This happened in urban and rural areas”.*

*“Since a year ago, rapid developments occurred especially at main towns like Johor Bahru, Kuala Lumpur, and Pulau Pinang...these areas are representative for the South, Middle, and North of Malaysia...Do not miss Sabah and Sarawak. Aaa...if observe the previous and current time period, then we would notice that development has destroyed the original landforms without realising”.*

*“Development is needed for Malaysia, Aaa...but we should monitor every new development projects especially those involved with environmental degradation issues”.*

*“If we cannot cater to problems of degradation...hence future generations will face more problems and not live in good conditions. Aaa...The current condition in Malaysia is quite precarious because of many things”.*

[Source: Public II, 2014]

Based on the above statements, Public II had mentioned that the development activities could give effects especially in the form of landforms changes. This means that the participant also agreed that environmental degradation issues would affect the environment. Meanwhile, in getting the information about the effects of forest degradation issues, another cohort in environment field, namely project implementers, was also interviewed by the researcher. The Project Implementer I said:

*“Based on my experience in environmental development projects,...there are many effects toward environment when people are involved in any development project. Aaa...one thing was our economic part would be increased because of investment by insiders and outsiders as well”.*

*“Even though Malaysia has many natural resources, when they do not pay serious attention, little by little the resources will finish and be destroyed”.*

*“Much research associated with the environment was done in Malaysia, Aaa...since Malaysia was announced as an independent nation...most research finding showed movement in physical environment itself...for instance...Aaa...housing projects changed the figure of environment and the effects of ecology, water, and land, are also huge. Either they are doing the projects by adhering to each of the rules or just to ensure that their aims to develop in the areas are achieved”.*

[Source: Project Implementer I, 2014]

The opinion from Project Implementer I described about what was experienced during handling development projects. It was mentioned that the movement in the physical environment was the main effect when forest degradation issues occurred in Malaysia. Meanwhile, Project Implementer II said:

*“Environmental degradation issues occurred many years ago. Either we are concerned or not...Aaa...lately in the 21st century era the degradation issues are getting more problematic for this country”.*

*“These issues actually give impacts and effects on any economic activity. Why these issues are becoming more popular than before? It is because of the mission of this country toward becoming a developed nation, which means Malaysia can achieve similar GDP rates other developed countries, which is good for infrastructure, good for services, and good for manufacturing as well. All of the components we call as an economic activity”.*

*“Either we are like or not, the development activities should be continuously parallel with the mission. In fact, when we fail to moved towards the aims, hence this country wouldn’t get the achievement...the serious effects when the degradation issues occurred was the movement of physical an environment. For instance...Aaa...many hills were destroyed and slope failure occurred in many places. From that kind of problems, it will give effect to another problem like floods and soil infertility”.*

[Source: Project Implementer I, 2014]

From this statement, it is clearly stated by Project Implementer II that forest degradation issues could give effects to the environment as well. This was based on his statement of the movement of physical an environment.

Based on the in depth interviews with the participants who are experts about this field, the findings revealed that the effects of forest degradation issues in Malaysia would affect more toward environment aspects. This means that from the experienced, they had noticed that the effects particularly give more negative effects when compared to positive ones. These findings were obtained from the participants who were in a different cohort and in different situations. But ultimately, the final output was the same opinion and ideas.

Aside, discussing about the effects of forest degradation issues, the researcher also asked respondents about the impacts of forest degradation issues toward the environment.

## 5.2.6 Impacts of Forest Degradation Issues on the Environment

This section describes the trend change pattern of impacts of forest degradation issues on the environment. These findings were obtained from the eight participants in this study who had dealings with the different cohorts, but faced the same area that is focused on environment matters. Based on the interview sessions, Academician I stated:

*“Environmental degradation issues would also give much impact towards our surrounding. For instance...we will face with the health problems and indirectly giving impacts towards comfort zone of life as well”.*

*“Since a many years ago, we didn’t hear about the serious of health problems...but nowadays there are many cases about diseases occurred in our country. Aaa...one of the main factor is because of the environment is not in the good condition”.*

*“As a human, we need to take a breath every day; instead...we also need the fresh and good quality of air. The increased of pollution, especially air pollution will caused the bad impacts to societies”.*

[Source: Academician I, 2014]

The statements from Academician I mentioned that the effects of forest degradation issues is more toward health problems and disturbing the quality of life. The participant gave an example of the phenomena in the environment. It was also stressed that these problems would harm the good quality of the environment. Meanwhile, Academician II said:

*“Effects and Impacts are two different things that should we noticed about that...The impacts of environmental degradation issues would give bad impacts to livelihood activities. Aaa...for instance, when environmental degradation issues were occurred in our surrounding, it would give bad impacts towards the comfortable life”.*

*“This problem is more focus to weather condition. Somehow we couldn’t adapt with the different temperature like too hot or it’s too*

*cold. The changes of weather associated with the environmental degradation will continuously giving problems to societies if no action to rid the problems itself”.*

*“However...the impacts also towards health condition. Aaa...actually this problem is intertwined between each other. When the environmental degradation become serious, so that the problems also getting worst towards peoples”.*

[Source: Academician II, 2014]

Based on the above statements, the participant did mention that the impacts of forest degradation issues could negatively influence livelihood activities. These things include all the problems in having a good life. From the statements, he agreed that impacts could disturb a good quality of life and constrains the people in doing activities in life. Besides, these statements are also echoed by the Researcher cohort as well. Researcher I stated:

*“Based on my observation about the impacts of environmental degradation issues...there is many impacts that we can see through clearly namely it’s was giving impact for livelihood activities...For instance...when the environmental problems occur such as prolonged flooding, it was giving impact for those who involved in agricultural economic activities”.*

*“Like farmers...Aaa...when they just rely on agricultural products, so this situation would give bad impact to them to support their families”.*

[Source: Researcher I, 2014]

From the opinion and observation, Researcher I had mentioned the impacts of the degradation issues and the resulting impacts on livelihood activities. The participant gave an example of the situation about the economic activities and the household. An impact is more toward bad situation of household income particularly. Moreover, Researcher II gave:

*“Impacts means there are something will happen towards others which is giving the good or bad results....environmental degradation issues are one of the big problems in environment...Aaa...Even though the environmental problems were occurred since many years ago, but*

*the frequencies of these matters are common happen lately. For example...each of development projects which are not in well monitoring would contribute problems in environment”.*

*“We can see such as housing projects which dealing directly with environment...if the project not get the fully attention and not follow the regulations, hence it would give bad reputations towards society and surroundings...This is because the regulations are very important to follow by any developers to avoid the seriousness of environmental problems”.*

*“The significant impacts are involved the comfortable of life and the level health of societies...if this things are not showing the negative impacts, so that the quality of life also been decreased”.*

[Source: Researcher II, 2014]

Statement by Researcher II refers to the impacts that would disrupt the comfortable life and the level of health of the people. This means that, when the degradation issues occur, human life is impacted as well. The views of participants who deal with research projects might be different from the opinion by a person making the policy for environment. Next, the opinion by Policy Maker I:

*“Ok...Ministry and department who are deals with environment are also concerns about this matter...we have a specific department which conducts the problems in environment”.*

*“Each of projects which under the observation by ministries or department must have the rules and regulations...Aaa...We did the meetings and discussion about any problems which associated with the environment...Each of the tasks followed by different niche and expertise. We did the records also about the results and did the plans and actions how to cater the problems itself”.*

*“Most of the problems which involved in impacts of environmental degradation issues are focusing on livelihood activities....From the reports which collected by each of department...when the environmental degradation occurred, so that societies whose involved in agricultural economic activities such as farmer, fisherman and any activities which related more with environment would give big impacts to them...Aaa...Somehow it's was disturb their income and salary. These things were give more problems to them until that area recovering from disaster”.*

[Source: Policy Maker I, 2014]

Participant stated his answer with the statement of the responsibility by Ministry and department in environment. He did mention the problems which involved in impacts of forest degradation issues are focusing on livelihood activities as well. Meanwhile, the opinion from Policy Maker II might be different with the certain issues. Then, the statement by Policy Maker II said:

*“As a person who been dealing with the ministry and department towards environmental planning...there are some of the impacts deals with the environmental degradation issues”.*

*“These opinions are come from reports and observation about that kind of things...Aaa...Every year each of department will submit the reports about the environmental situation in Malaysia. Then, we will seat together with every department for looks into the problems and the real situations was happened in Malaysia especially for those states which always facing with the disaster like slope failure, flooding and drought...From that reports, we will try to match every problems with the solutions”.*

*“These things actually would turn to policy that we had implement in Malaysia...Somehow, Aaa...we found that this problems occurred just because that peoples itself didn't follow the rules and regulations. For example, when they did some new projects, they didn't attention about the impacts and effects towards surroundings...They only thinking about the profits and just fulfil the requirement provided for the necessities of life”.*

*“The big impact of environmental degradation issues is health problems...We got reports from Ministry of Health about this thing...then the reports was announced that every year the increasing of health problems in Malaysia is showing more alarming and need to attention to let off the cases”.*

[Source: Policy Maker II, 2014]

The explanation by Policy Maker II was in-depth compared Policy Maker I. He did mention the root of the problems in environment and the causes too. He also stressed the big impact of forest degradation issues could affect health problems. Meaning that, forest degradation which occurred would harm surrounding peoples. The statement more established based on the report by Malaysia Ministry of Health.

Nevertheless, opinion from Public also needed to get know in terms of their experience and opinion based on the observation. Next, Public I stated:

*“Beside effects of environmental degradation issues, there are also many impacts of environmental degradations. From my observations, the impacts more giving bad things towards peoples”.*

*“Since I was kids, I could see that more peoples are healthy and happy with their life. Not many problems associated with health. We could take a breath with the fresh air every day and also no pollution more like nowadays”.*

*“When environmental degradation issues occurred, more peoples getting sick and somehow they couldn’t do outdoor activities just because of the bad weather and the condition of environment is not allowed them to go to outside from their home”.*

[Source: Public I, 2014]

From the statement above, Public I had mention about the degradation issues could give impacts towards people. He’s also said *more peoples getting sick and somehow they couldn’t do outdoor activities just because of the bad weather and the condition of environment is not allowed them to go to outside from their home*. Means that, the impacts are would give bad implication for livelihood activities. Moreover, this statement might be different compared with the Public II opinion. The statement sounds like:

*“...Impacts of environmental degradation issues means will give negative impacts to peoples in terms of economics and socials...The impacts for economics means the situations will disturb their activities such as for their income for every day...Aaa...This is more concern to peoples which is doing something directly towards environment”.*

*“Somehow they couldn’t control the pollution came to their areas, but they have to accept it even they didn’t do the problems towards environment...This situations will caused big more problems to all peoples”.*

*“So...when the degradation issues give bad impacts in economics, it’s will give impacts to social as well. These means, peoples will lose the comfortable of their life...When the economics to fall, hence their social life also will fall too. From this thing, the more problems are created towards societies”.*

Public II had mention the impacts of forest degradation issues were more towards the economics. When the environmental problems occurred, then the economic activities could disturb and give the problems to household indirectly. This statement came from his observation and his experienced about that matter. Nevertheless, the opinion by Project Implementer might be having a different kind of information. The Project Implementer I said:

*“...Based on the observation about the impacts of environmental degradation issues, there is many impacts that we can see through clearly namely it’s was giving impact for livelihood activities. For instance...Aaa...when the environmental problems occur such as prolonged flooding, it was giving impact for those who involved in agricultural economic activities”.*

*“For instance...like farmers, when they just rely on agricultural products, so this situation would give bad impact to them to support their families”.*

[Source: Project Implementer I, 2014]

Project Implementer also gives the same opinion about the impacts of forest degradation issues. He did mention about the negative effects when people had an environmental problems. He addressed about the agricultural activities could get the implications when the degradation occurred from time to time. Moreover, the opinion by Project Implementer II:

*“...As a person who been dealing with the development projects towards environmental planning, there are some of the impacts deals with the environmental degradation issues”.*

*“Aaa...These opinions are came from experienced and observation about that kind of things...Every year each of project department will submit the reports about the environmental situation in their areas. Aaa...Then, we will seat together with every projects department for looks into the problems and the real situations was happened in the*

*areas especially for those states which always facing with the disaster like slope failure, flooding and drought. From that reports, we will try to match every problems with the solutions”.*

*“These things actually would turn to rules and regulation that we had implement in Malaysia. Somehow, we found that this problems occurred just because that peoples itself didn’t follow the rules and regulations. For example...when they did some new projects, they didn’t attention about the impacts and effects towards surroundings. Aaa...They only thinking about the profits and just fulfil the requirement provided for the necessities of life”.*

*“...The big impact of environmental degradation issues is dealing health problems. Aaa...Some reports from Ministry of Health about this thing, then the reports was announced that every year the increasing of health problems in Malaysia is showing more alarming and need to attention to let off the cases”.*

[Source: Project Implementer II, 2014]

The opinion by Project Implementer II inclined with health problems as well. From his experienced dealing with the employer and people surrounding, they noticed when this things happened, thus the rate of health would decrease and should get the attention from government to solve this problems.

Apparently, based on the statements given by participants in this study, most of them said the same opinion. There are three big impacts when the degradation issues occurred namely livelihood activities would effected, health problems could increase by time to time and the impacts towards the quality of life as well. This keywords get from the in-depth interview with the participants which is involve in this study particularly.

### **5.3 Forest Management Strategies**

Objective three more focused on the results of forest management. The data were also gathered by interview sessions to get the in depth opinion by respondents. These parts discuss more about forest management efforts in Malaysia particularly. Besides, this section also provides description of the relationship between forest degradation and forest management efforts. Also included are discussions on the forest degradation issues impact on quality of life in Malaysia as well.

#### **5.3.1 Development Planning Strategies in Malaysia**

This section discusses the strategic development planning in Malaysia. The information about the strategies was collected from government reports and Malaysia Plan (1<sup>st</sup> MP – 10<sup>th</sup> MP) reports. Each piece of information associated with these development planning strategies in Malaysia was sorted and arranged in a single table. Table 5.6 below contains the strategies through development planning which are National Economic Plan (NEP), National Development Plan (NDP), and National Vision Planning (NVP).

Development plan strategies were implemented in earnest since the NEP (1971-1990) development phase. Table 5.6 below summarises the strategies in terms of “Forest Development”. The arrangement of the table is more fixed about the main component of environment which is land, air, water and ecology. Each of the components describes about the directly associated development with those components. Development is a big issue and covers several of topics. The forest development subject is also one of the large matters to discuss. Nevertheless, this

study does not cover all the information and paid notice toward some matters due to some obstacles in fulfilling all the strategies in development planning in Malaysia. Some data might be lacking because of the information gathered in not in great details and unclear in terms of the explanation.

Based on Table 5.6 below, the findings are more focus on development strategies for forest management. The results showed the condition of each component during the development occurring in the respective areas. Besides, the notice about the effects happened while the development and the mechanism was proposed and implemented by government to overcome environmental problems. The information stated was based on the big environmental issues that frequently happened in those areas.

The summary of Table 5.6 below is for management of forest in Malaysia. There are management strategies for forest which is covering all the strategies deals with environment in Malaysia. More deals are about agriculture, sewerage and domestic, industrialisation, animal waste, disposal of toxic and hazardous waste and solid waste disposal, agriculture, forestry itself, nature conservation, nature and natural resources conservation, conservation of natural habitats, and resources.

**Table 5.7: Forest Management in Development Planning Strategies in Malaysia**

<b>Development Planning</b>	<b>Forest Management</b>
<b>National Economic Policy (NEP)</b>	<ul style="list-style-type: none"> <li>• Pollution is most common in agricultural land, where increased efforts to raise productivity are the principal source of pollution. Pollutants in these cases include the whole range of fertilizers, pesticides, herbicides and the gaseous by-products of industrial processes.</li> <li>• Mining, new agricultural settlement, replanting of existing lands, logging and urban and general infrastructure development</li> <li>• A large proportion of the populations live in valleys and river and river basins which are flood-prone.</li> <li>• Land use. Soil conservation. The control of runoffs from newly developed land for agriculture, housing, industry, roads, highways, and other infrastructural development was undertaken more on ad hoc basis</li> <li>• These industries had to dispose of the accumulating toxic and hazardous wastes captured in settling tanks in the treatment of highly polluting effluent.</li> <li>• Land use. More than 35 per cent of the Land in Peninsular Malaysia has been developed for agriculture, mining, urbanization and infrastructure.</li> <li>• Industrialisation in Malaysia has been achieved so far without serious and far-reaching environmental problems.</li> <li>• Heavy industries including chemical plants, thermal power stations and petroleum refineries are so far not concentrated in any one area with the result that they have not been a major source of pollution.</li> <li>• Dust and fumes from quarries and cement plants, the incineration of waste and fumes from traffic in dense urban areas are probably the most serious of air pollution. They sometimes reach levels hazardous to health.</li> <li>• Noise pollution. A problem which can be contained by enforcement of industrial and health regulations. Noise and visual pollution in the general environment are increasingly serious problems. Effective town and country planning will have an important role to play in the respect.</li> </ul>

	<ul style="list-style-type: none"> <li>• Treatment of polluting effluent and the recovery of other waste matters as energy in the form of biogas and electricity as well as animal feed.</li> <li>• Air conservation. Control of industrial emissions. The problems of air pollution were controlled largely through the enforcement of the Environmental Quality (Clean Air) Regulations, 1978 By October 1984, 31 factories were charged in court for various offences under the Clean Air Regulations</li> <li>• Noise control. A National Noise Control Committee was established to study and monitor all aspects of the problem. Appropriate regulations for noise control were formulated. Noise monitoring was also conducted in various towns to determine typical noise levels experienced by the public due to industrial operations, construction activities, motor traffic and aircraft landings.</li> <li>• Its caused by spoliation of land by tin mining, by increasing deforestation for agricultural expansion, by careless land development, by increasing industrial sewerage and domestic wastes, by growing use of agricultural fertilizers and pesticides and by increasing use of estuarine and coastal waters for transport and recreation.</li> <li>• Sewerage and domestic waste waters from populated areas, effluent discharges from agro-industries, particularly palm oil and rubber processing factories, industrial effluents, silt from mining ponds, land clearing and urban and highway development, and the use of agricultural chemicals, including both pesticides and fertilizers.</li> <li>• In coastal areas, port activities and rapidly expanding waterfront industries, including the establishment of major naval facilities and shipyards, are potential sources of pollution which may significantly affect inshore fisheries.</li> <li>• Water pollution control. Agro based industries. Both the palm oil and rubber processing industries continued to be regulated under the respective Environmental Quality (Prescribed Premises)(Crude Palm Oil) Regulations, 1977 and the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978.</li> <li>• In both palm oil and rubber processing industries, the concurrent R&amp;D efforts by the private sector played a significant part in evolving the indigenous development of treatment technology for palm oil wastes and rubber effluents.</li> <li>• Mining. The department of mines took further steps to control the discharge and runoffs from tin-mining areas, largely through the enforcement of the various state mining enactments and rules.</li> <li>• Solid waste disposal. There was also a significant increase in the percentage of wastes being disposed of by incineration rather than by open burning.</li> </ul>
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	<ul style="list-style-type: none"> <li>• The loss of genetic materials contained in the thousands of species of organisms living in the forests which may be of potential importance for plant breeding and in control of pests and disease in agriculture and forestry also requires attention.</li> <li>• The preservation of representative samples of Malaysia's natural forest ecosystems with its constituent flora and fauna is therefore particularly important.</li> <li>• Nature conservation. Terrestrial parks and reserves. The preservation of representative areas of natural forest and marine ecosystems with its constituent flora and fauna continued to be accorded due important.</li> </ul>
<p><b>National Development Policy (NDP)</b></p>	<ul style="list-style-type: none"> <li>• Industrial and while land clearing, unregulated development, mining and logging activities in the catchment areas were responsible for sedimentation and siltation problems.</li> <li>• Sewage contamination mainly from both domestic and animal wastes, as indicated by faecal coliform, was found in Pahang, Perak, Pulau Pinang and Sarawak.</li> <li>• Land Resources. Negative impact of land development such as erosion and landslips, the Town and Country Planning Act, 1976 was amended in 1994.</li> <li>• The screening and approval of development plans at the State Level were given emphasis through the setting up of State Planning Committees which provided a channel for the coordination and proper management of natural resources.</li> <li>• While, the agricultural sector is relatively lower compared with others sectors of the economy, the development of agriculture will continue to be important in the nation's development.</li> <li>• The open burning of industrial wastes, particularly in wood based and rubber-based factories, remains a major problem. The open burning of wastes at local authority dumping grounds was also found to be a problem.</li> <li>• Pollution from oil spills. During the Fifth Malaysia Plan period, more sightings of oil spills were reported from oil platforms.</li> <li>• The meteorological stations recorded an increase in atmospheric acidification.</li> <li>• Trans-boundary atmospheric pollution contributed to serious haze problem in 1991, 1992 and 1994.</li> <li>• Black smoke emission from diesel-powered vehicles.</li> <li>• Open burning of waste, effluent discharges, illegal disposal of toxic and hazardous waste and marine pollution.</li> <li>• A number of river estuaries in the States of Johor, Kedah, Kelantan, Perak, Pulau Pinang, Selangor and Terengganu were also contaminated. This was due to high population density, unorganized disposal of human wastes in squatter areas, increased urbanization, the prevalence of dense settlements along the coast and the lack of adequate facilities for sewage treatment.</li> <li>• Water Pollution. Industrial sources of water pollution continued to be concentrated on the west coast of</li> </ul>

	<p>Peninsular Malaysia, with Johor, Pulau Pinang and Selangor accounting for almost 50 per cent.</p> <ul style="list-style-type: none"> <li>• Pollution from non-industrial waste, the most significant contributor of organic pollution in inland waters, showed little improvement during the Fifth Plan period. Sewage remains the main contributor to organic pollution accounting for three times the combined load discharged from industries and animal husbandry.</li> <li>• Pollution load from sewage continued to increase due to greater urbanization and inadequate sewerage facilities as only 5 per cent of the urban population benefited from centralized sewerage facilities</li> <li>• Sewage contributed 65 per cent of water pollution in terms of BOD, while agriculture and industry accounted for 27 per cent and 8.0 per cent respectively.</li> <li>• Highland development and land clearing activities also resulted in an increase in suspended solids and changes in the morphological characteristics of rivers. These activities contributed to increased flooding as well as pollution of coastal and marine areas.</li> <li>• Hazardous Substances and Waste</li> <li>• The main sources of river water pollution were from the discharge of domestic sewage, manufacturing, pig farming, agricultural production and land clearing and earthworks.</li> <li>• Nature and natural resources conservation will be given priority through a responsible and well-balanced exploitation of natural resources which will safeguard the requirement of future generations.</li> <li>• Efforts will be taken to ensure effective and well-coordinated enforcement of such strategies and programmes by further upgrading the regulatory machinery at the States and Local Government levels.</li> </ul>
<p style="text-align: center;"><b>National Vision Policy (NVP)</b></p>	<ul style="list-style-type: none"> <li>• The agriculture sector is targeted to be an important source of growth. Its growth will mainly be derived from the significant increase in industrial crops, food production and contribution from new activities.</li> <li>• Land utilization will be intensified through the adoption of agro-forestry approach, which integrates agriculture and forestry activities and through the wider practice of crop-mix.</li> <li>• During this time period, will include improving air and water quality, efficient management of solid waste and toxic and industrial waste, developing a healthy urban environment and the conservation of natural habitats and resources.</li> <li>• Implementation of Criteria, Indicators and Activities of Forest Management</li> <li>• Multi-Storied Forest Management in Malaysia Phase II</li> <li>• Operational Studies on Silvicultural Treatments Phase III</li> <li>• Operational Studies on Growth and Yield Phase III</li> </ul>

	<ul style="list-style-type: none"> <li>• Study on Forest Road Construction in RIL Methodology</li> <li>• Forest Rehabilitation</li> <li>• Assessment of Values of Forest Products and Services in Peninsular Malaysia</li> <li>• Seeding and Tree Breeding Project</li> <li>• Agro-Forestry</li> <li>• Conservation of Biological Diversity</li> <li>• Forest Management Plan for the Pahang Peat Swamp Forest Reserve</li> <li>• Forest Management Station</li> <li>• Assessment of Treatment Operations of Residual Stands for second cut</li> <li>• Reforestation and Forest Conservation</li> <li>• Formulation of Guidelines for the Management of Kapur, Seraya and Meranti Built Forests</li> <li>• Forestry Prevention and Control</li> <li>• Economic Assessment of Biological Diversity in Peninsular Malaysia</li> <li>• Recreational Forest Phase II</li> <li>• Management and Development of Forest State Parks</li> <li>• Establishment and Development of Water Catchment Forest in Permanent Reserved Forests</li> <li>• Establishment and Development of Medicinal Plants and Forest Herbs</li> <li>• Forest Road Maintenance</li> <li>• Pilot Project on Central Forest Spine</li> <li>• Pilot Project on Forest Management using Radio Frequency Identification</li> <li>• Planting of Mangrove and Other Suitable Tree Species in Coastal Region</li> <li>• Rattan Planting Plan</li> <li>• Project on Bamboo Planting</li> <li>• Renovation of Forestry Training Unit Complex</li> <li>• Forest Harvesting Training Centre Phase II</li> <li>• Management of Worker's Occupational safety and Health in the Forestry Sector</li> <li>• Development of Commercial Forest Plantation</li> </ul>
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	<ul style="list-style-type: none"><li>• Maintenance and Monitoring of Rubber Timber Plantation Phase II</li><li>• National and State Networking for Seedings and Planting Materials Acquisitions</li><li>• Monitoring of Forest Plantation growth and yield permanent sample plots</li><li>• Development of permanent reserved forests in Federal Territory</li><li>• Forestry Information Extention</li><li>• IT and K-Forestry Phase I</li><li>• IT and K-Forestry Phase II</li><li>• Continuous Forest Resource Monitoring</li><li>• Continuous Forest Resource Assessment</li><li>• Construction of Staff Quarters for Forestry Department Headquarters Peninsular Malaysia</li><li>• Forestry Museum Development</li></ul>
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### **5.3.2 Trends of Forest Policy in Malaysia**

Forestry practices have become more environmentally friendly and at the same time, more interactive with the general public and the community. Malaysia formed in 1963 and consists of three regions, namely, Peninsular Malaysia (composed of 11 Federated Malay States which achieved independence from the British government in 1957), Sarawak and Sabah. Since then, three separate bodies have determined Malaysia's forest policy namely Peninsular Malaysia Forestry Department in Kuala Lumpur, the Forestry Department Sabah and the Forestry Department Sarawak (Oon et.al, 2002).

Besides, according Oon et.al (2002), Under Article 74 (2) of the Malaysian Constitution, forestry is a state matter, and as such, the thirteen state governments have complete jurisdiction over their forest resources. Each state is empowered to enact laws on forestry and to formulate forestry policy independently. The federal government only provides technical advice and assistance on forest management, training, the conduct of research, and in the maintenance of experimental and demonstration stations. Nonetheless, a close relationship between the states and federal government is essential regarding all land and forestry issues.

The policy was begun with the National Forest Policy. In Peninsular Malaysia an Interim Forestry Policy was first formulated in 1952, and officially adopted as the National Forestry Policy (NFP) in 1978. In Sarawak, the Sarawak Forest Ordinance was 1954. Provides the necessary legal framework, while in Sabah, the Sabah Forest Enactment 1968 provides the legal backing to ensure the implementation of state forest policy.

Article 74 (2) of Federal Constitution related with List III in the Ninth Schedule of Federal Constitution provides that forest is under the jurisdiction of the state. Under this provision, the Legislature of a state may make Laws and regulation for the administration and management of forestry matters in the state. Federal Government only provides advice and technical assistance to the states, maintenance of trial stations and demonstration stations, training and research. According to Article 91(5) of Federal Constitution the Function of the National Land Council (NLC) to formulate from time to time, a national policy for the promotion and control of the utilisation of land throughout the Federation for mining, agriculture, forestry or any other purpose and the administration of any laws relating there for and the Federal and State Governments shall follow the policy so formulated.

Report by Department of Forestry stated, in 1977, the National Forestry Policy (NFP) was approved by the NFC and later endorsed by the NLC on 19 April 1978. This policy was revised on November 1992 to take cognisance of the concern expressed by the world community on the importance of biological diversity conservation and the sustainable utilisation of genetic resources, as well as the role of local communities in forest development. The acceptances of the Policy are a major breakthrough in strengthening the institutional base and enhance the cooperation and understanding between the Federal and State Governments in the field of forestry sector development.

National Forestry Policy (NFP) for Peninsular Malaysia was formulated and approved for implementation in 1978. The NFP is implemented through the National Forestry Act of 1984. Key aspects of NFP are:

- To dedicate areas of forest land as Permanent Forest Estate (PFE) ;
- To manage the PFE with the objective of maximizing social, economic and environmental benefits in accordance with the principles of sound forest management
- To pursue a programme of forest development through regeneration and rehabilitation operations ;
- To ensure thorough and efficient utilization of forest resources, not included in the PFE ;
- To promote sound harvesting techniques and utilization of all forms of forest produce and to stimulate the development of wood-based industries ; and
- To undertake and support a comprehensive programme of forestry training.

The Policy then followed with the National Policy on Biological Diversity. In 1998, the National Policy on Biodiversity (MOSTE, 1998) was formulated to protect Malaysia's rich flora and fauna for the benefit of present and future generations. It aims to set the direction for Malaysia to implement strategies, action plans and programmes on the conservation of biological diversity and the sustainable utilisation of biological resources. Conservation and sustainable utilisation of Malaysia's biological diversity are based on the following principles and considerations:

- a) The conservation ethic, including the inherent right to existence of all living forms, which is deeply rooted in the religious and cultural values of all Malaysians;

- b) Biological diversity is a national heritage that must be sustainably managed and wisely utilized today and conserved for future generations;
- c) Biological resources are natural capital and their conservation is an investment that will yield benefits locally, nationally and globally for present and future generations;
- d) The benefits derived from the sustainable management of biological diversity will accrue, directly or indirectly, throughout every sector of society;
- e) The sustainable management of biological diversity is the responsibility of all sectors of society;
- f) It is the duty of the Government to formulate and implement the policy framework for sustainable management and utilization of biological diversity in close cooperation with scientists, the business community and the public;
- g) The role of local communities in the conservation, management and utilization of biological diversity must be recognized and their rightful share of benefits should be ensured;
- h) Issues in biological diversity transcend national boundaries and Malaysia must continue to exercise a proactive and constructive role in international activities;
- i) The interdependence of nations on biological diversity and in the utilization of its components for the well-being of mankind is recognized. International cooperation and collaboration is vital for fair and equitable sharing of biological resources, as well as to ensure access to and transfer of relevant technology;
- j) Public awareness and education is essential for ensuring the conservation of biological diversity and the sustainable utilisation of its components; and

- k) In the utilization of biological diversity, including the development of biotechnology, the principles and practice of bio-safety should be adhered to.

The Policies related are Third National Agricultural Policy (1998-2010), Second Industrial Master Plan (1996 – 2005), National Eco-Tourism Plan, National Biodiversity Policy and National Policy on the Environment. There are other legislations relating to forestry. The following is a list of other legislation which is of relevance to the forestry sector:

- Water Enactment Act 1935
- National Land Code 1965
- Penal Code (Revised 1997) (Act 574)
- Criminal Procedure Code (Revised 1999) (Act 593)
- Evidence Act 1950 (Amendment 1993)
- Financial Procedure Act 1967 (Amendment 1993)
- Mining Enactment 1926
- Electricity Supply Act 1990
- Aboriginal Peoples Act 1954
- Registration of Business Act 1956
- Land Protection Act 1960
- Land Conservation Act 1960
- Partnership Act 1961
- Companies Act 1965
- Factories and Machinery Act 1967
- Street, Drainage and Building Act 1974
- Local Government Act 1976
- Town and Country Planning Act 1976
- National Park Act 1980 (Amendment 1983)
- Biosafety Act 2007
- International Trade in Endangered Species Act 2008
- National Forestry Act 1984 (Act 313)

- Protection of Wild Life Act 1972 (Act 76)
- Malaysian Timber Industry Board Act 1973
- Environmental Quality Act 1974 (Act 127)
- Environmental Quality (Prescribed Activities)
- (Environmental Impact Assessment) Order 1987
- Malaysian Forestry Research and Development Act 1985
- Wood-based Industries (State Legislatures Competency) Act 1984 (Act 314)
- Wildlife Conservation Act 2010
- Mineral Development Act 1994 (Act 525); and
- Fisheries Act 1985 (Act 317)

### **5.3.3 Categorisation of Forest Management Efforts in Malaysia**

Malaysia had state a good development planning based on the phase of development. From the data information sort in development planning, researcher got the list of planning which was implemented by government during that phase. To getting the in-depth information about the efforts by government for ensures our environment is in the good quality, hence researcher asked some of the questions to participants about the categorisation of forest management efforts should have in Malaysia. The opinion about the categorisation is needed so that we could categorize based on their fields. With the opinion, the categorisation would help government and other parties to ensure our environment is monitored.

Participants were asked by researcher about their opinion in terms of the categorisation of forest management efforts. Academician I stated:

*“...An environmental management effort means the attempts by governments and other parties which deal with the environment in directly”.*

*“Aaa...The categorisations would be the classifications of the main components in environment such as land, water, air and ecology...The categorisations is actually was done by Ministry and some of department in environment”.*

[Source: Academician I, 2014]

Academic I had mention that Ministry already put the categorisations for each of the component in environment. It means that, classifications should remain with the department which deals with the component of environment. Meanwhile, the statement by Academician II:

*“...Environmental management efforts are the efforts by governments such as the planning and good management towards environment...Aaa...Any issues associated with environments should get the serious action by them”.*

*“For categorisation of the environmental management efforts, government, private sector and NGO’s should discuss and get the guidance how to manage our environment with a good implementation”.*

*“In my opinion, it’s should be categorise by each of the component of environment likes land, air, water and ecology aspects...Aaa...Each of the components is too big, but they must arrange each of them wisely...It might be they can look the guidelines by others country as an example to implement for this country”.*

[Source: Academician II, 2014]

This statement refers to the efforts should take the responsibilities by government, private sector and NGO’s. Participant suggested that the categorisation is based on the each of the component of environment. But then, he was stated with the statement *it might be they can look the guidelines by others country as an example to implement for this country*. The guidelines to arrange the categorisation is needed for references. Meanwhile, Researcher I then mentioned:

*“...As a person who been dealing with environmental research, environmental efforts could be categorisation with the many ways...Aaa...One of them is through the problems and issues. For example, we should concern more about what are the main problems*

*in our environment...If some of the areas was got flooding, so we must seek of the sources of the tragedy”.*

*“When we do like this hence, each of the problems could settle with the good system of implementation...Aaa...Each of states in Malaysia should provide their team to doing the enforcement for serious environmental problems in their areas”.*

[Source: Researcher I, 2014]

The opinion was different with Researcher I. He stated, forest management efforts could be categorise in many ways. One of the categorisation was through the problems and issues of environmental problems. He added, each of states should take the responsibilities to solve the environmental problems. Moreover, Researcher II said:

*“...Environmental management efforts are one of the good ideas to cater about the management towards environment...Aaa...The categorisations should deals with the main component of environment such as land, water, air and ecology...That’s the components that we should concerns more because it’s was involved the problems in environment”.*

*“Each of department which is managed of the issues and problems about environment must do with the serious enforcement...Aaa...The monitoring and enforcement must follow the regulations and arrangement with the good systems”.*

[Source: Researcher II, 2014]

Researcher II agreed with the efforts role in forest management. He also said categorisation based on the main component of environment is the best idea. Each of department, who deals with the main component of environment task, should monitor and doing the enforcement for caters the environmental problems. Next, the Policy Maker I said:

*“...Since we are the part of management of environmental concern, so we are also responsible about what we have done towards the planning...Aaa...Each of department which in charge about the*

*environment matter should taking seriously about the issues in environment”.*

*“The approaches of environmental efforts are actually done by the certain department which focuses in environment...Aaa...There are listing of planning and mechanism by governments to solve the problems...Somehow the environmental problems occurred at the one time for the same areas, so that, the recovery need the time because the allocation of money and peoples to solve the problems”.*

[Source: Policy Maker I, 2014]

From the statement, Policy Maker I stated each of department which in charge the environment matter should take the responsibility. That means each of departments should arrange the best system for solve the environmental problems.

*“Malaysia Government did the planning and management for environment. Since government implement the policy in environment, they did some of the assessment for the implementation”.*

*“Each of department which is concern for land, air, water and ecology doing the implementation and assessment about that kind of things. We did the efforts towards environment with the planning and management. There are department to handle the problems which is for technical and management. The co-operation among of them is needed to solve the environmental issues in Malaysia”.*

[Source: Policy Maker II, 2014]

Policy Maker II had mentions government did the planning and management for forest. Again, he also said each of department which concern for the main component of environment should do the implementation and the assessment particularly. Meanwhile, participant by the Public I stated:

*“...For the environmental management effort, it's supposed to divide into the main component in environment, such as land, water and ecology...Aaa...Each of the components was contribute for environmental issues like pollution and environmental degradation issues”.*

*“If government is really determined to solve all the environmental problems in this country...all the efforts will successful due the serious enforcement by them”.*

[Source: Public I, 2014]

The opinion by Public I was mention about the categorisation should divide into the main component in environment as well. The determination by government to solve environmental problems is needed to decrease the level of pollution and emission. Moreover, having said by Public II:

*“An environmental problem was occurred since many years ago...Aaa...Malaysia is one of the countries which were facing with the environmental issues same goes with the other countries in the world. For my opinion...Malaysia already did a lot of efforts to solve the environmental problems”.*

*“To categorise the environmental management efforts, it can be categorise by the main component of environment like land, water, air and ecology...If the categorisation is clear, so that the problems of environmental issues will handle with systematic”.*

[Source: Public II, 2014]

Participant by Public II mentioned that the categorisation is by the main component of environment as well. He was added, if the categorisation is clear, hence the environmental problems would handle with the systematic. It means, the good arrangement should provide in the organization which deals with part of the environment. Besides, the opinion by Project Implementer also code to get some of the information based on their experience deals with the environmental projects. Project Implementer I said:

*“Ok...As a person who been dealing with environmental projects, environmental efforts could be categorisation with the many ways...Aaa...One of them is through the problems and issues...For example, we should concern more about what are the main problems in our environment...If some of the areas was got flooding, so we must seek of the sources of the tragedy”.*

*“When we do like this hence, each of the problems could settle with the good system of implementation...Each of states in Malaysia should provide their team to doing the enforcement for serious environmental problems in their areas”.*

[Source: Project Implementer I, 2014]

Here is different opinion by Project Implementer I. He stated the categorisation should follow with the problems and issues. It means that, each of the problems should get the concerned with the variety of fields in environment. From that way, the problems are easier to solve and will get the best way to cater it. Then, Project Implementer II said:

*“...Environmental management efforts are one of the good ideas to cater about the management towards environment...Aaa...The categorisations should deals with the main component of environment such as land, water, air and ecology...That’s the components that we should concerns more because it’s was involved the problems in environment”.*

*“Each of department which is managed of the issues and problems about environment must do with the serious enforcement...The monitoring and enforcement must follow the regulations and arrangement with the good systems”.*

[Source: Project Implementer II, 2014]

Based on the statement above, it’s clearly shows that Project Implementer choose the categorisation should deals with the department which involve in the main component of environment namely land, water, air and ecology. Serious enforcement is needed to ensure they do the task and make an effort for that kind of things.

Above is describes the approach to categorisation of forest management efforts in Malaysia. There are five categories as stated by the respondents to choose the best approach for categorising the forest management. The categorisations were based on the main components of environment (land, air, water, and ecology),

categorisation by big issues of environmental problems, categorisation by stakeholders, categorisation by systems, and others. In order to answer the questions, each participant is representative of two experts in different cohorts.

### 5.3.4 Impacts on Quality of Life

Forest degradation issues is one problem facing any developing countries, whether they realise it or otherwise. In order to achieve Malaysia's target to become a sustainable development nation, there is another matter that should be considered, which is the impacts on quality of life. Instead of forest degradation issues could give bad impacts towards the environment, but then would give some impacts towards quality of life. The impact on environment and the impact on quality of life are different based on the different opinion by participants. Academician I said:

*"...Apparently, environmental degradation issues would give impacts on quality of life...Good quality of life means we can life in this world with the comfortable zone area...Each level of ages needs the difference...different facilities".*

*"Good quality of life also can define as societies will live without get disturb by surroundings...Aaa...For instance, for life, we need the basic of necessary of life such as food, shelter and cloth...If environmental degradation issues occurred, each of the three things will give impacts to human as well...By slowly it will disturb human life and make uncomfortable to them".*

[Source: Academician I, 2014]

Statement by Academician I, forest degradation issues could give impacts towards quality of life in terms of life itself. That means, the impacts more to disturb people of life such as into the economic household economy. Meanwhile, Academician II stated:

*"...Good quality of life is desire by all peoples in this world....Human need their needs is fulfil with completely...Aaa...Actually, environmental degradation would give big impacts towards human".*

*"For instance,...human need foods in their life, if they eat something which is not from the good sources, it will give impacts towards their health...If we eat fish which is come from polluted sea, it will give impact to our health also...That impact is for the long time in*

*life...From the foods, will disturb our health and we can't focus on our work...So, one problem happened will effects to others thing."*

[Source: Academician II, 2014]

Academician II claimed that forest degradation issues would give big impacts to human. The impacts were especially for human health. The emission could pollute the component of environment and spoiled the resources. Moreover, the opinion by researcher:

*"...As a group of researcher in environmental research, we found that environmental degradation issues were give big impacts towards human life...All these things happened because of the human and environment is doing the interaction each other every day and every time".*

*"A lot of research was done before discussed about the human quality of life...The findings show that every component of the environment was released the pollution and caused the problems to human life".*

[Source: Researcher I, 2014]

The statement by Researcher I was same with Academician I. He's told the forest degradation issues were giving big impacts towards human life. Previous research done by researchers proved the statement. But then, Researcher II had mention:

*"...Research is one of the tools to get to know about the impacts and effects for something...Many research was done in Malaysia about the quality of life, even now many agencies run the many research about this matters...The aim is only to seek of the solution how to give the comfortable in life for societies".*

*"Environmental degradation issues are one of the big problems in this world...Aaa...Somehow, we catch towards developed country, but we forget to balance with the parallel of environment and development...These things would give bad impacts towards quality of life for human".*

*"If for many years ago we can have a fresh air, but nowadays we can see that our environment was polluted here and there...Ultimately, our quality of life is in bad rank and need for the serious action by government".*

[Source: Researcher II, 2014]

Researcher II stated the forest degradation issues would give bad impacts towards quality of life for human. He's gave the example in terms of the environmental pollution occurred at any places and could disturb people life. Though the opinion by Policy Maker I:

*"...When the government doing the implementation of the environmental planning, they also did the assessment to know the problems if some of the plan is get failure".*

*"From the reports...Aaa...there are impacts of environmental degradation issues towards quality of life...Among of the effects are associated with human life...We get the reports from Ministry of health which is reported that every year the cases of diseases cause of environment".*

[Source: Policy Maker I, 2014]

He's said impacts of forest degradation issues towards quality of life were into the human life itself. People got diseases from time to time because of environmental problems. Again, another participant stressed out the point of the impacts of EDI on quality of life. Then, the opinion by Policy Maker II:

*"...Quality of life is the most important things to human in this world...Every human need to fulfil their needs for lives in comfortable zone...They are willing to pay to get the good quality of life...Aaa...A many years ago, they didn't claim about the comfort zone life, but nowadays they are seeking towards that".*

*"Ministry and departments who deals with environmental planning and implementation did their enforcement to get the results...Aaa...Some of the results show the bad impacts of quality of life...When the environmental degradation occurred, many things towards human also will change caused by that problems. Among the problems was involved about the economy activities, health and livelihood activities".*

[Source: Policy Maker II, 2014]

From the statement highlight by Policy Maker II, when the forest degradation occurred, many things about human could change because of the environmental

problems. He's added among the problems was in terms of economic activities, human health and livelihood activities. Next, the opinion by Public I:

*"...Environmental degradation issues would give bad impacts towards quality of life for human...Aaa...There are a lot of impacts in human life if environmental degradation is not prevented by us"*.

*"Among of the impacts when the environmental degradation happened is that day by day the quality of life will be decrease and not in the good condition"*.

*"From of my observation,...when the environmental degradation occurred, human will not live in the comfortable area such as when the temperature of world increase, so it will occurs the change of weather in certain area...Somehow human cannot adapt with the situation which happen it all of sudden. These things will disturb people life for the long time period"*.

[Source: Public I, 2014]

Participant by Public I mentioned the forest degradation issues could disturb people of life such as the level of quality would decrease by slowly. He did mention about the living in the comfortable area are essential to get the good quality of life.

Then, Public II said:

*"...A many years ago, I didn't hear that people around me get the problems with our environment...But...these situations were different compared with nowadays...This is because, our world already getting old and need for the decreasing of development"*.

*"Environmental degradation issues were give bad impacts towards human...Aaa...This is because; we did the development without doing the balance for development...For this recent time, we can see the livelihood of human activities is not in the good condition...Some of the economic activities for societies also had the big impacts...For instance for whose doing the fisherman and farmer economic activities, Aaa...They will lose their income and need to find for another solution to give life for their families"*.

[Source: Public II, 2014]

Public II gave the comparison between the prior and the current situation of Malaysia's environment situation. From that, he's said the impacts were the forest degradation given the bad impact towards the quality of life. He's added the example

to agricultural activities which would disturb cause of the environmental problems.

Nevertheless, the opinion by Project Implementer I:

*“...As a person who has been involved in environmental project, I found that environmental degradation issues were give big impacts towards human life...Aaa...All these things happened because of the human and environment is doing the interaction each other every day and every time”.*

*“A lot of development projects were done before discussed about the human quality of life...The findings show that every component of the environment was released the pollution and caused the problems to human life”.*

[Source: Project Implementer I, 2014]

Statement from Project Implementer I claimed the impacts on quality of life could give the big impacts towards human life. These opinion based on his experienced in development project associated with environment. Meanwhile, Project Implementer II had own his perception about this kind of thing. He said:

*“...Research is one of the tools to get to know about the impacts and effects for something...Aaa...Many research was done in Malaysia about the quality of life, even now many agencies run the many research about this matters...The aim is only to seek of the solution how to give the comfortable in life for societies”.*

*“Environmental degradation issues are one of the big problems in this world...Somehow, we catch towards developed country, but we forget to balance with the parallel of environment and development...These things would give bad impacts towards quality of life for human”.*

*“In for many years ago we can have a fresh air, ...but nowadays we can see that our environment was polluted here and there...Ultimately, our quality of life is in bad rank and need for the serious action by government”.*

[Source: Project Implementer II, 2014]

Project Implementer II had mention about the project development which connected with our environment as a directly. From his statement, his agreed the impacts on quality of life were give bad impacts towards quality of life for human. He's added the serious action by government is needed to cater these problems.

The in-depth interviewed done with the experts whose been dealing with this matters. From the session, researcher asked the questions which line with the research objective. Then, the finding for the impacts on quality of life is give bad impacts towards human life. All of the participants was highlighted the keywords of the statement. Researcher was team the dialog which get from the interviewed session. Each of the words line are original came from the participants.

#### **5.4 Existing Forest Management Strategies in Sustainable Development Goals**

This objective refers to the effectiveness of the existing forest management strategy in achieving sustainable development goals. Forest management strategies are different with other countries. Malaysia has its own style to managing the environment. These include the practical and management themes as well. In order to ensure the environment is in good condition, the efforts must always be in good enforcement and implementation. In Malaysia, the government and private sectors cooperate with each other to protect the forest and environment. Malaysia also actively participates in collaboration at national, regional, and international levels. This objective also investigates the effectiveness either the forest management efforts is successful for this country or otherwise. The strategic development plan in Malaysia will be discussed in this section. The knowledge about Malaysia cooperation and involvement at the level of national, regional and international levels also will be discussed in this section.

According annual reports by department of forestry, the Forestry Department has always been actively undertaking collaborative project in forestry through international, regional and bilateral arrangement with various funding agencies. These

projects are initiated in order to enhance the skills and capabilities of foresters in forest resources planning, development and management, as well as the transfer of appropriate technology in forestry. At the Regional or ASEAN level, technical co-operation in tropical forestry involved ASEAN Common Forestry Policy, Technical Co-operation, Forestry Institution, Co-operation in Intra-ASEAN Timber Trade and ASEAN Common Stand on International Issues of Forestry. While, at the International level, organisations such as the FAO, UNDP, World Bank, and the International Tropical Timber Organisation (ITTO) have rendered technical and financial assistance towards forestry development in the country. Malaysia is an active member of ITTO and subscribes to the ITTO year 2000 Objectives.

Malaysia also fully subscribes to the statements of Principles on Forests and the various forestry programs under Agenda 21 adopted at the United Nations Conference on Environment and Development (UNCED) held in Rio De Janeiro, Brazil in June 1992, as well as the Convention on Biological Diversity and the Framework Convention on Climate Change which Malaysia has ratified on 24 June and 13 July 1994 respectively. Malaysia has and will continue to participate actively in the post-UNCED discussions on forest and forest-related matters. In this regard, the country has participated effectively in the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forest (IFF) and will continue to participate actively in the recently established United Nations Forum on Forests (UNFF) which has been established for the duration 2001-2005.

For bilateral cooperation in projects of the international level is being implemented by the FDPM are as follows:

**Table 5.8: Bilateral cooperation in Projects of the International Level**

Bil.	Project Name	Countries
1.	Sustainable Forest Management and Conservation Project in Peninsular Malaysia	Malaysia/German (GTZ)
2.	Management and Conservation Sustainable Use of Peat Swamp Forests and Associated Water Regimes in Malaysia	Malaysia/ DANIDA
3.	Sharing of Information and Experience on Private Sector Success Stories in Sustainable Forest Management	Malaysia/ITTO
4.	Sustainable Forest Management and Development Phase II	Malaysia/ITTO

To achieve Sustainable Forest Management, Malaysia has committed to maintain at least 50% of her land area under forest and tree cover in perpetuity as pledged under the 1992 Rio Earth Summit. This is attained through the protection of forests and the application of Sustainable Forest Management (SFM) practices. According to Malaysia's Second National Communication to the UNFCCC, 56% of the country was covered in forests in 2000 and 55% remained covered by 2007 (NRE, 2011) and forest cover in 2012 is estimated to be closer to 53%. These figures include permanent reserve forests, state land forests, national parks and wildlife and bird sanctuaries (NRE, 2011). Out of the total forested area in Malaysia equalling 18.3 million hectares, Sarawak has 8.07 million hectares, Sabah has 4.36 million hectares and Peninsular Malaysia has 5.87 million hectares (NRE, 2011). Statistics from the Food and Agricultural Organisation of the United Nations, reports that national forest and tree cover in 2010 equals 62% of the total land area (FAO, 2011).

Forestry Department in Malaysia also involved in REDD+ strategies to determine the level and extent of national level mitigation actions to be taken, ensures at least 50% of national land mass is forested and intact, ensures water supply for both domestic and industrial use, ensures soil fertility for crop production and for

community adaptation to climate change. REDD is addresses the emissions reduction. The ‘+’is addresses the carbon sequestration or removal through conservation, sustainable management of forests and enhancement of forest carbon stocks. Section 10, NFA 1984, allows PRF be classified into any of the following twelve (12) functional classes for effective contribution to livelihood; and to further promote sustainable forest management and taking into account the multiple roles or uses of forest namely:

**Table 5.9: Twelve (12) Functional Classes**

Timber Production Forest under sustained yield	Soil Protection Forest
Soil Reclamation Forest	
Flood Control Forest	
Water Catchment Forest	
Forest Sanctuary for Wildlife	
Virgin Jungle Reserves	
Amenity Forest	
Education Forest	
Research Forest	
Forest for Federal purposes	
Forest State Parks	

For REDD+ Implementation strategies with The National Steering Committee on REDD +, will provide guidance and recommendation on the REDD + implementation in Malaysia. Besides, The National Technical Committee on REDD + will be provide guidance on methodology and technical issues. Then, REDD+ activities will be implemented by the respective State Forestry Departments guided by the National REDD+ Strategy and State’s Development Plan and Policies or State REDD+ Policy and the result based actions will be accounted at national level.

#### **5.4.1 Sustainable Development Targets**

This part is relates to the opinions by respondents on Malaysia toward achieving sustainable development country status. To answer this question, 10 of the

respondents needed to give their opinion about the current condition of Malaysian forest management to achieve the aim and targets. The opinion is based on their observation and experience related to Malaysian development and environment.

As mentioned in Chapter II, Malaysia targets toward achieving sustainable development by year 2020. Along the development, the management of forest resources development and the forest degradation issues would follow suit. This section shall conclude the opinions by selected experts to answer this question wisely.

Based on the explanation in their interviewed session, majority of them are not confident that Malaysia could achieve the targets toward achieving sustainable development country status by 2020. The academicians stated that Malaysia cannot achieve the targets by 2020. The opinion same goes with researchers, policy makers, public, and project implementers as well. Nevertheless, some of them said that it might happen, but mostly might not due some reasons. Academician I said:

*“...Malaysia is in the progressing towards developed country...Since era Tun Mahathir Mohamad, he posted the vision 2020 as the guidelines towards achieving the mission...Vision 2020 also was stressed about the Malaysia will achieve as a developed country which balance development”.*

*“Balance development means that economic development is balance with the achievement of good quality of life...Aaa...This mission also refers to achieving sustainable development in Malaysia”.*

*“Starting by this year (2014) we only have six years more towards 2020...In my opinion...we can't achieve for the mission as a sustainable development because of the lack of achievement in social, economic and political aspects”.*

[Source: Academician I, 2014]

From that statement above, Academician I gave the fact of information about the Malaysia development. Eventually, he's said that Malaysia could achieve the

mission as sustainable development by 2020. Meanwhile, Academician II had a mention:

*“...Sustainable development is one of the elusive terms for the development...Malaysia is in progressing towards sustainable development nation like others country which already achieved their mission”.*

*“Malaysia already went through their journey towards achieving that mission...Even though some of the planned was not achieved with the successful, but they still in the lines to achieve it”.*

*“Malaysia has a good planning for developments...Government is trying to fulfil the demand by peoples who living in this country...Environment was one of the indicators to ensure that whose stay in this country can get the good health and good quality of life”.*

*“In my opinion...Aaa...Malaysia is still in their progress towards achieving as a sustainable development country...I can't conclude either Malaysia is already success with their mission or Malaysia is already failed about the mission...Ultimately, Malaysia is one of the country which looking seriously about the mission towards achieving sustainable development nation”.*

[Source: Academician II, 2014]

Academician II was highlight the statement about the sustainable development is one of the elusive terms for the development. Then, he said Malaysia is still in their progress towards achieving the mission. He's just gave the conclusion which Malaysia is in effort and looking seriously to achieve the mission. Moreover, the opinion from Researcher I like:

*“...As a developing country, Malaysia was facing with much experience in development aspects...Since Pre-NEP Malaysia developed their Nation with aim and mission. Each of the development planning in Malaysia was emphasizes the good development for their society”.*

*“So many researches about Malaysia were released by researches in science and social sciences as well...We agreed that Malaysia have huge environmental resources to develop with their own mould”.*

*“To achieving as a sustainable development country...Aaa...I don't think that Malaysia can achieve their mission towards that in 2020...There are certain parts in environment which still not sustain and balanced...For instance, we cannot settle the floods problem in certain areas...Every year these problems might be happened in those*

*areas...This thing shows the truth of environmental management itself”.*

[Source: Researcher I, 2014]

Statement above by Researcher I said that Malaysia can't achieve their mission towards sustainable development nation by 2020. He added, there are certain parts in environment aspect which still not sustain and balanced. Next, having said that by Researcher II, he said:

*“...There is no short cut to achieving as a sustainable development nation for certain countries...Aaa...Malaysia itself was facing their problems to achieving their targets. Somehow everything is not parallel in the line”.*

*“The co-operation is the main factors to achieve the aim and mission too...Each of the sectors which contribute to Malaysia economics should know the missions and co-operate together for one aim...To get the co-operation is not an easy matter... Everybody should unite, and then our mission would be complete in time frame”.*

*“As a researcher who is dealing with environmental concerns, Frankly speaking, my opinion that to achieving sustainable development nation for Malaysia by 2020, is not an easy matter...Aaa...Maybe certain part of sustainable development thing, it would be achieve, but for environment aspect, I don't think that Malaysia can achieve for four years later...It might be 10 years, 20 years more, who knows”.*

[Source: Researcher II, 2014]

Researcher II concluded his opinion with the statement that Malaysia can't achieve their mission to achieve sustainable development nation by 2020. Lack of time was the factors to get the mission. He's said it might be another more years to can achieve the mission. Moreover, opinion by Policy Maker I like:

*“...In development planning, since 2002 Malaysia was start their aim to achieve as sustainable development nation in 2020...The planning was built their efforts to ensure that the aim could be accomplished...Since that time also, government more focused on environmental issues and more allocation for built environment”.*

*“For us as a Policy Makers, we just implement the Policy which came from government...For environment concerns, it is not deals with*

*environment field only, but then involve all over the fields such as economics, social, politics and so on”.*

*“Malaysia itself, the Policy is already there, the law and regulations also was wrote with clearly...Aaa...The main point to achieving as a sustainable development nation by 2020, it could be happen if each of the aspects in environmental rules is obey by them...That’s not impossible for Malaysia to achieve sustainable development nation by 2020”.*

[Source: Policy Maker I, 2014]

Based on statement above, Policy Maker I claimed that Malaysia could achieve their target in sustainable development. Though, Malaysia can achieve if each of the aspects in environmental rules is fulfilled by them. Besides, Policy Maker II said:

*“...Towards sustainable development nations is one of the Malaysia mission...In Eight Malaysia Planning was mentioned about that thing...Under the plan also, it was stated about the framework to achieve the targets...Each of main components in environment was highlighted with the methods to conserve and maintain the situation to decrease rate of pollution”.*

*“Aaa...For the situation like Malaysia, the rate of pollution could be less if all the parties give their commitment to counter environmental problems in their area...Even though government put the policy for rehabilitation, if they didn’t follow the rules, so that the mission couldn’t be achieving on the time”.*

*“It’s hard to say that Malaysia can achieve as a sustainable development nation by 2020...Nevertheless, the prior and current Malaysia efforts will make a possible for the true achievement as a sustainable development nation”.*

[Source: Policy Maker I, 2014]

Policy Maker II made the statement that it’s hard for Malaysia to achieve the target as a sustainable development nation by 2020. But then, he’s claimed the efforts by Malaysia could be make a possible in the achieving the mission. Next, having said that by Public I, he did mention:

*“...Sustainable development means what we have done by today is for our next generations...If we harm our environment today, hence our next generations or future generations can’t enjoy the good quality of environment”.*

*“From my observations since many years ago, Malaysia is good to plan their development...Means that, they didn’t grow up as a simultaneously, but growing with gradually”.*

*“However...to achieve as a sustainable development nation, there are need much time to ensure all of the aspects are fulfilled...For my opinion, Malaysia can’t achieve their mission towards sustainable development nation by 2020. Malaysia needs 20 years or more to achieve their target towards that”.*

[Source: Public I, 2014]

Public I was state that from his observation, Malaysia had a good plan into their development. But then, to achieve as a sustainable development nation, Malaysia is can’t achieve it. Same goes opinion by Researcher II did mention that Malaysia need a more another year for that kind of thing. Meanwhile, Public II had his own opinion about that. He’s said:

*“...Since many years ago, I found that Malaysia was very good in development strategy compared our neighbour country such as Indonesia...Each of the planning is well-planned”.*

*“Even though we are facing with environmental issues and environmental problems, but Malaysia still can produce good quality of production...For instance, product of agriculture and manufacturing which is still gives more profits to Malaysia developments”.*

*“In my opinion...Aaa...to achieve as a sustainable development nation by 2020 is not possible for Malaysia. But then, the achieving is not for all of the aspects of sustainable development. Certain parts are fulfilled, but for others need more research and enforcement”.*

[Source: Public II, 2014]

It was different opinion by Public II. He was state, Malaysia is not possible to achieve sustainable development nation by 2020, but only in a certain parts of the mission. That means, he’s still have confident that Malaysia is able to achieve some of their mission towards sustainable development nation. Moreover, having said that by Project Implementer I, he’s said:

*“...As a developing country, Malaysia was facing with much experience in development aspects. Since Pre-NEP Malaysia developed their Nation with aim and mission...Each of the development planning in Malaysia was emphasizes the good development for their society”.*

*“So many researches about Malaysia were released by researches in science and social sciences as well...Aaa...We agreed that Malaysia have huge environmental resources to develop with their own mould”.*

*“To achieving as a sustainable development country, I don't think that Malaysia can achieve their mission towards that in 2020...Why??...There are certain parts in environment which still not sustain and balanced. For instance,...we cannot settle the floods problem in certain areas...Every year these problems might be happened in those areas. This thing shows the truth of environmental management itself”.*

[Source: Project Implementer I, 2014]

Project Implementer was state he's is not confident that Malaysia could achieve their target to achieve sustainable development nation by 2020. He's explained more about the environmental problems which still not solve since years ago. Environmental management should systematic and established if Malaysia really aim towards achieving the sustainable development nation. Then, having said by

Project Implementer II:

*“...There is no short cut to achieving as a sustainable development nation for certain countries...Malaysia itself was facing their problems to achieving their targets...Somehow everything is not parallel in the line”.*

*“The co-operation is the main factors to achieve the aim and mission too...Aaa...Each of the sectors which contribute to Malaysia economics should know the missions and co-operate together for one aim...To get the co-operation is not an easy matter...Everybody should unite, and then our mission would be complete in time frame”.*

*“As a project manager, who is been dealing with environmental concerns, Honestly speaking, in my opinion...to achieving sustainable development nation for Malaysia by 2020, is not an easy matter...Maybe certain part of sustainable development thing, it would be achieved, but for environment aspect, I don't think that Malaysia can achieve for four years later. It might be another years more”.*

[Source: Project Implementer II, 2014]

Based on his statement above, he had an opinion that Malaysia can't achieve their target in 2020. He's also stressed out the necessary should Malaysia fulfilled to achieve the target. In order to achieve the target of sustainable development nation, Malaysia should doing the good implementation and enforcement into the environmental problems particularly.

The discussion above is stressed out the Malaysia target towards achieving the sustainable development nation. From the questions were asked to all participants, most of them agreed to said, Malaysia can't achieve their mission as sustainable development nation by 2020. But then, they're agreed that Malaysia could achieve the target in another more years with the good management, implementation and enforcement. Details about the problems in environment should take as serious matter because it will cause the big implications to surroundings.

## **5.5 SWOC Analysis**

This section describes the SWOC analysis for this study. SWOC analysis is one tool that organisations can use to dig more for Strengths, Weaknesses, Opportunities, and Constraints particularly. Each piece of information needs to be discussed with detail for a clear explanation of SWOC analysis. Moreover, SWOC analysis is the mechanism to conclude all the important themes for this study.

### **5.5.1 Strengths**

As this study investigated forest management strategies, the appraisal of strategies would give good impact on the policies set up by the country. Regardless of the roles

and positions that participants hold, they need to give full support toward all programmes and activities set up by the government in achieving environmental goals aspired by the government. The strength of this appraisal can be seen in Malaysia as it has rich natural resources in terms of forest products. Based on these varieties of natural resources, Malaysia should preserve and ensure that all these components of environments are always monitored. Malaysia also has proposed and underlined the rules and regulations pertaining to environmental law. Based on previous research and observations, it is recognised that Malaysia has taken serious actions to ensure that the country's environment is always in check. Besides, Malaysia also has good networking with other countries as well. Also, Malaysia has forest which is give source of food, shelter and income for local community.

### **5.5.2 Weaknesses**

Nevertheless, there are some weaknesses revealed by this study. Among of them is the (lack of or little) compliance to the regulations that are in place; these policies should be obeyed by all parties directly or indirectly involved in forest preservation and protection. However, many of them did not follow through these policies with good implementation and monitoring processes, instead much of these regulations are taken for granted. Some parties including the industries place priorities on profit-making compared to the negative repercussions that would come along with serious forest degradation. Moreover, the lack of good experts in certain fields is also another significant weakness noted by this study. A number of government ministries and departments that are attached with forest management tasks do not have enough expertise and capabilities to handle all the problems that crop up in relation to forest

care; hence they could not achieve these targets wisely. Besides, some do not take seriously their role and responsibility towards forest rehabilitation.

### **5.5.3 Opportunities**

However, in spite of the weaknesses, the result of the appraisal in terms of forest management strategies also indicated some opportunities. A management strategy is the best attempt to achieve the goals. In the past, as a developing country, Malaysia executed development efforts without taking serious considerations about the effects toward the environment in the future. Eventually when environmental implications started to affect economic and social well-being of the nation and its people, only then did the country stepped up by taking actions that demonstrated more concern about this matter. Although it is still not too late for Malaysia to preserve their forest, the enforcement should be enhanced so that polluted areas could be recovered and further cases in the future would not occur, thus applying more consistent and wise conservation and preservation strategies. On the other hand, these forest management strategies could also be collaborated with other developing countries, particularly to discuss about the same problems and find ways to overcome environmental problems facing these countries.

### **5.5.4 Constraints**

Constraints here refer to some problems that hinder the plans and objectives in the process of achieving goals. In the context of this study, the constraints identified were concerned with the forest management strategies where the efforts are still not yielding the expected results in the certain parts. This was found to be due to the lack

of budget allocations to implement the targeted project objectives. If allocations are sufficient, they could do more research toward a sustainable forest management; they could also buy the right equipment to overcome the arising forest degradation issues. Besides that, research and past experiences have shown that environmental complications do not bear entirely isolated consequences. Constraints also involved trans-boundary issues. Environmental problems do not occur in only the country that is affected by it, but the aftermath would affect other nearby countries too. For instance, if a neighbouring country experiences a particular air pollution phenomenon; its effects would be felt by other nearby countries because air constantly moves and shifts and does not stay static at the same place or area. Forest also is very crucial and critical for community livelihood.

## **5.6 Conclusion**

In this chapter, the focus is more on the results generated for each of the research questions that were stated in Chapter I. There are four main research objectives, which need to be answered using the data acquisition, data analysis, and data presentation processes, as was stated in Chapter III previously. The continuity between Chapter I and Chapter III, thus would complete Chapter V in displaying the results from the analysis. The findings were interpreted in the tables, and summarisations of interview data. Each section was explained in relation to the research objectives and research questions. In depth discussion of the results in this chapter will be done in Chapter VI.

## **CHAPTER 6: DISCUSSIONS**

### **6.1 Introduction**

This part of the dissertation refers to the discussion of findings and the framed against past research done before. This research followed the keywords in the research objectives to structure the findings of these fields. The prior literature review guided this research to get the final results of the study. In this chapter, the discussion focuses on the relations between the results and other studies which are in the same field. The findings from Chapter V and the literature review in Chapter II are discussed together to synchronise this study. Each research objective is discussed with the flows.

### **6.2 Forest Resource Development**

Objective one is related to the examine environmental resource development and forest resource development in Malaysia. There are five research questions as stated in the objective. This objective is exactly seeking the effects of forest resource development on the environment. In order to fulfil this first objective, thus five research questions were developed to prove the statement of the studies. The first objective was more focused on the relationship between forest resource development and forest degradation issues toward the environment. All answers for the established questions are related to previous research by other scholars. This objective was also translated into the timeline by looking at the trend change of environmental resource development in Malaysia within the time period from 1947 to 2014. Each of the

findings will be discussed following a set of prescribed steps. As a developing country, Malaysia generally has rich natural resources. Trend change of environmental resource development in Malaysia showed that Malaysia's increasing growth differs with the phase of development planned. The term natural capital (or environmental resources) refers to the stock of natural resources (energy and matter) and processes that produce valuable goods and services. It consists of resources (renewable and non-renewable) and ecosystem services (Rankin, 2014).

The development in Malaysia was observed to be different between the prior and after independence. Through time, Malaysia slowly adopted a different development approach with the different Prime Minister era. Each of the Prime Ministers brought different ways to utilise environmental resources for development activities. The increasing of the population would increase the demand for food, shelter, and utilities. Growth percentage had increased year by year. This occurrence had activated the government to plan alternatives to solve the on-going problems. Indicators of wealth, which reflect the quantity of resources available to a society, provide no information about the allocation of those resources. For instance, the information about more or less equitable distribution of income among social groups, about the shares of resource used to provide free health and education services, and about the effects of production and consumption on people's environment (McGillivray, 2008). Economic development refers to growth accompanied by qualitative changes in the structure of production and employment, generally referred to as structural change. Of particular importance for developing economies increase in

the share of the dynamic industrial sector in national output and employment, and a decrease of the share of agriculture (Szirmai, 2005).

Human is an important component in the interaction between components in the environment, namely land, air, water, and ecology. Humans need land for building houses for shelter, planting trees on the land as a food source as well as an agent for oxygen production for breathing. Besides, humans also need water for continuation their lives. The four main components of the environment are related each other to fulfil human needs on the Earth. Although the report in other developing countries considered that “measurements of differences and changes in levels of living could be carried out satisfactorily without reference to norms”, it recognised that positive measures of levels of living must reflect generally accepted aims for social and economic policy at the international level in particular areas such as health, nutrition, housing, employment, education, and etc. (Nielsen, 2013). As discussed earlier the trend change of ERD in Malaysia, the timeline showed the increasing of consumption of ERD based on the graph line with proved that an increase in total population would increase production from economic activities which is reflected in the GDP value of growth. The relationship between the environment and economic growth has been the subject of intense debate over the past few decades (Tang, Liu, Zhang, & Yu, 2014). Human development is parallel with economic development. This statement was supported by Fischer-Kowalski and Swilling (2011), where the only way to resolve contemporary social and ecological challenges of 21st Century urbanism is to adopt a development paradigm that is able to reconcile resource consumption and economic growth with environmental restoration and human development. Findings also found

the main sectors of the economy which generate the big contribution for development in Malaysia, which are agriculture, livestock, forestry and fishing, mining and quarrying, manufacturing, and construction. There are of course others economic activities, but in this study, the main sectors which were stated in the Malaysian annual budget were selected based on their priority in production for Malaysia.

The timeline showed the trend change for each economic sector. The different percentages of growth are categorised by the different development plan, like Colonial Times, Pre-National Economic Plan (NEP), National Economic Plan (NEP), National Development Plan (NDP), and National Vision Planning (NVP). Each of these development plans illustrated different consumption rates of environmental resources and the different types of environmental degradation issues. According to Gallopin (2003) and Hyman (2011), economic growth and development via non-material growth would thus become possible within the resource-constrained economy. Environmental degradation became an issue and then a priority on the political and institutional agenda, only after and as a consequence of becoming prominent on the social agenda (Boyle, 1998). In order to discuss the particular issues of environmental resources development, forest development was chosen as the example of resources development. A finding was digging the information of forest resources in Malaysia. It noticed that forest area in Malaysia has changed every year caused by the development activities. According to Yong et.al (2014), the focus is largely on direct or proximate causes like industrial logging, large-scale commercial oil palm plantations and agribusiness, road construction and large dams. Far less attention is paid to the indirect or underlying causes and agents, inter-linking and working to enrich the very few

while creating hardships for many people as a result of degraded or diminished resources. Besides agriculture activities, the explored of forest involved a many of development planned, it was such as for tin-mining, housing, industrial areas, new area of development, and some of the production likes logs, sawn timber, plywood and mouldings like said by Fitzherbert et al. (2008), deforestation and development of agricultural fields increase provisional survives, but reduce biodiversity and genetic resources. Then, results clearly stated Malaysia had a planned for their resources forest. The number of Permanent Reserve Forest shown the total number which slightly same since the year 1990 till 2014. The changes just have in small scales. But, it's different with the state land forest. The mapping team from University of Maryland that documented forest loss and gain between 2000 and 2012 using satellite images, revealed that Malaysia is one of three countries in the world with the highest national rates of deforestation (the other two countries being Cambodia and Paraguay), Malaysia lost 14.4% of its forests from 2000-2012, the world's highest rate, Malaysia is ranked ninth in the world in highest area of forest loss. During 2000-2012, Malaysia lost a larger proportion of its dense forests (over 75% canopy) than any other major tropical forest nation, an estimated 4.5 million ha of forests namely equivalent to a football pitch every 1.5 minutes. Between a year's 2010-2012 alone, Malaysia has lost 4.72 million ha of forests Deforestation during the last decade is actually worse in Malaysia, in percentage terms, than in Indonesia. Actual deforestation rates in Malaysia since 2000 have been three times higher than Malaysia reports to the FAO (2010). Each of the states in Malaysia had a different immensity. The differentiation was stated the number of forest width according to their land area. Since the year 1990

till 2014, the number of million hectares shows the decreasing of total immensity. The example given based on the previous research done by World Resource Institute (1998) was the rate of deforestation in Malaysia reached an average of 1.8% per year between 1981 and 1990, which was among the highest in the world. According to Omar & Hamzah (2012) was the three major forest types in Malaysia are Inland forest, peat swamp forest and mangrove forest. Then, divided into the different layer of forest likes upper montane, lower montane, upper dipterocarp, hill dipterocarp, lowland dipterocarp, peat swamp and mangroves Malaysia is known for its diverse forest resource. These forest types are Ericaceous Forest, Montane Oak Forest, Highland Dipterocarp Forest, Hill Dipterocarp Forest, Lowland Dipterocarp Forest, Swap Forest and Mangrove Forest. This statement supported by Here & Enter, n.d.

A forest degradation issue is one of the matters related to the consumption of environmental resources development. Any development is directly related to environmental resource development. Exploration of forest resource development would create the forest degradation issues and would give impacts and effects for a long period time. Findings showed the forest degradation issues occurring during each development phase in Malaysia. Forest degradation issues occurred when the development was not well-planned and did not follow the rules such as the classifications by Environmental Impacts Assessment (EIA) rules. The failure to obey the conditions would give bad impacts toward the surroundings. As mentioned in Chapter II, the report by WCED (1987) also stated that in recent years, industrial countries have been able to achieve economic growth using less energy and raw materials per unit of output. This, along with the efforts to reduce the emission of

pollutants, will help to contain the pressure on the biosphere. This statement also was also supported by Kamble (2013) where the problems of environmental issues normally would occur when the development activities begin. Any development activities related to land exploration would change the landforms and somehow create degradation issues, such as slope failure, soil erosion, and floods as well. These findings are in line with Sheraz (2014) where the consequences of polluted water, land, and soils are most visible in deteriorating health, lost agricultural productivity, and damaged ecosystems of the surroundings.

Despite the fact that consumption of forest resource development is being affected toward the environment and will cause forest degradation issues, this would encourage the Malaysian government to carefully make wise planning into any development activities. A finding was found in the trends of intensity and frequency of environmental degradation issues in Malaysia from 1947 to 2014. These trends are different when compared to each of the environmental components. Intensity and frequency of some events often occurred at the same time. That event refers to the evolution of forest degradation issues through the time. Based on these findings, Malaysia had frequently occurring forest degradation issues during the National Development Plan (NDP) phase. Analysis showed the truth from evidence in the annual reports and interview data with experts which also affirmed the results. Visible and apparent environmental degradation catalysed the public's demand for environmental protection in the latter half of the 20th century (Keene & Pullin, 2011). There are many aspects of the national and global causes and consequences of environmental degradation and social injustice. Causes include overpopulation, air and

water pollution, deforestation, global warming, unsustainable agricultural and fishing practices, overconsumption (“affluenza”), misdistribution of wealth, the rise of the corporation, Third World debt crisis, and militarisation and wars. Consequences include increased poverty, overcrowding, famine, weather extremes, species loss, acute and chronic medical illnesses, war and human rights abuses, and an increasingly unstable global situation that portends Malthusian conditions (Donohoe, 2003).

A developing country is a country that is still exploring their resources to fulfil their aim toward achieving a developed country status. Usually, each development phase would record the results of either achieving their targets or failure in a certain part. Improvements are needed for every development phase to ensure the achieved quality is high and fulfils the requirement of projects. Even though developments would consider the environment, forest degradation issues still occurred because the exploration of environmental areas would leave effects and give impacts on the surroundings. Developing countries face a particular dilemma caused by the relationship between future economic growth and large scale environmental degradation resulting from poor planning and unregulated development. As a developing country, Malaysia is also at a critical stage where increasing economic growth is high on its political agenda (Lee, 2010). According to Churchill (2005), the history and culture of a people embody the effects of previous habitats and of their final environment; but this would mean something more than just local geographic conditions. It involves influences emanating from far beyond the borders. The trend changes of forest degradation issues in Malaysia also give effects toward the economy, politics, social landforms changes, and more polluting on surroundings. These results

were listed by experts who were interviewed about the effects of forest degradation issues in Malaysia.

Trend changes showed that forest degradation issues gave the effects when Malaysia was doing the development. The development activities include the exploration of land, the disposal of waste into water, the increasing transport on the road, and the industrial activities such as emissions from the factory production, and so on so forth. Since Malaysia actively plans the growing economic levels, their activities gave an effect of the environment. Moreover, Kamble (2013) also stated that the speed with which changes in resource use takes place gives a little time in which to anticipate and prevent unexpected effects. Moreover, Costantini and Monni (2007) also stated that there are specific links between economic growth, natural resources, human development, and even globalisation where institutional quality and schooling are specific dimensions of the wider concept of human development approach. Additionally, Sheraz (2014) also mentioned that natural resources can contribute significantly to development in different ways, such as by generating an economic activity and as a source of growth; as a livelihood, by providing much-needed jobs for people thereby reducing poverty; and supporting the achievement of the Millennium Development Goals (MDGs).

Instead of forest degradation issues giving effects toward the surrounding, forest degradation issues also would give bad impacts. Findings that the trend change of forest degradation issues impacts also occurred in Malaysia. From the interview of some experts in their different fields of environment, they stated that the impacts of forest degradation issues are more toward impacts on health conditions, livelihood

activities, social problems, and quality of life. In a research performed by Mokhtar and Ghani Aziz (2003), there are also problems related to public health concerns, forest degradation which impacts on the goods (biophysical resources) and services of the surrounding area. The increasing exploration of forest resources has impacted on one another. The interviewed experts had the same opinion in the discussion of the impacts of forest degradation issues. Even though experts were from different fields and situations, their invaluable experiences and observations helped to identify the reasons behind the issues related to the environment. According to Scholz and Binder (2003), in order to maintain a good quality of life, the forest degradation issues should be reduced to the level which has less of an impact and effect caused by environmental issues. Impacts on health condition would be the worst effect because it would directly affect the quality of life. All the impacts would disturb human life particularly. The impacts are actually related to each other. Through the findings of the trend changes of forest degradation issues impacts, it is clear that forest degradation issues impacts also began after Malaysia went through rapid development during the NDP phase. The impacts were less prior to the Independence period. Forest degradation issues were less and commonly occurred in certain areas which are faced with the changes of monsoon, such as in the east coast area. The negative environmental impacts of ocean energy may be caused by the alteration of currents and waves, alteration of substrates and sediment transport and deposition, alteration of habitats for benthic organisms, noise during construction and operation, emission of electromagnetic fields, interference with animal movements and migrations, and strike by rotor blades or other moving parts (Bao & Fang, 2013).

### **6.3 Forest Management Strategies**

According to the discussions above about the relationship between forest resource development and forest degradation issues, a finding was found that there are observable relations between them. The exploration of environmental resource development would cause forest degradation issues at the same time. The cases in forest degradation issues not only occurred in Malaysia, but other developing countries also are facing the same problems, but the difference is either the cases are less or worst. Forest degradation problems in Malaysia are still under control because the government generally puts their efforts to ensure that any development activities are registered with the legal parties. Malaysia covers fourteen states in Peninsular, Sabah and Sarawak. Each state has a forest resource with different broadness. These areas are under states' responsibility to cater for the development projects. The finding also tells that forest degradation issues would occur in the large cities, such as those in Johor, Pahang, Selangor, Pulau Pinang, Sabah, and Sarawak. These cases of forest degradation issues are often compared to other states. These things happened because the economic activities are active and the states are keen to establish industrial and manufacturing sectors. Most states contribute large amounts of income to the Malaysian economy. Forest degradation issues in those states would be reported annually as contributors to higher emissions in the air. The increasing transportation every year also contributes toward environmental problems in the states. Problems of health also recorded the variety of case related to environmental problems. This would require Malaysia to actively put their efforts on solving these occurring problems. Information from academicians, researchers, project implementers, policymakers, and

the general public is important to at least reduce the total forest degradation issues in Malaysia. The findings showed the trend changes for intensity and frequency of environmental degradation issues in Malaysia for the years 1947 to 2014. Indirectly, this information is vital for the government to improve or revise the forest management plans for reducing the impacts and effects caused by forest degradation issues. Geeson et al. (2015) stated that different stakeholders have varying degrees of influence and motivation to achieve sustainable land management. The statements about forest resource development and forest degradation issues in Malaysia support the need to continue research in identifying the forest management efforts adopted in Malaysia. Forest degradation occurred because of the initial cause which was detected in the annual reports by the government, and the data and information from the experts interviewed from different fields and different experiences. Both sources of the data and information are important to uncover the root of the problems. Data from government annual reports and development plans stated the forest management efforts to solve forest degradation issues in Malaysia. The findings found that forest management efforts need to be divided into categories to enable easy collection of information about the forest degradation issues for each state. From the interview sessions with experts, they recommended several types of categorizations which should be adopted in Malaysia, such as categorisation based on the main component of the environment, categorisation by big issues of forest degradation issues, categorisation by stakeholders, categorisation by systems, and also other categories. Nevertheless, good management of the forest development should follow the steps which had been outlined by Netherwood (1998), where the opinion of experts is

important as a representative of their cohorts. Somehow, the planned activities did not run well because of poor planning and not being able to reach the aims because of difficult to achieve targets.

The recommendation by experts for improving the conditions of forest management in Malaysia is that there is a need to categorise the efforts so that every organisation could follow the plans clearly and in a more arranged manner. Categorisation by big issues of forest degradation would entail a discussion about the priority of worst problems in the environment which would then be listed and be given serious attention. Interview with experts mentioned there are mechanisms and efforts adopted by the government to cater for forest degradation issues and at the same time to prevent them. Besides, the categorisation by stakeholders is also important to solve the forest degradation issues. Each stakeholder should take the position of supporting the government so that the attempts could affect by reducing the forest degradation issues. Cooperation between all stakeholders could help the effort to come true as planned. Alternatively, categorisation by system means the good forest management system should be given more attention. For instance, each development projects should be registered first, and then the monitoring of projects also need to be done often to continuously observe the progress and adherence, and there also needs to be enforcement by the responsible parties if the projects failed to follow the rules and regulations. According to Zhang and Wen (2008), in China, the establishment and management of natural reserves tend to be quantity-based, instead of quality-based, resulting in large numbers of reserves, and yet poor conservation practices. After the

establishment of natural reserves, local residents were prohibited from using the natural resources inside.

Forest management efforts are one of the important matters that show the government's perseverance toward decreasing the cases of forest degradation issues in Malaysia. These efforts are already there but the arrangement of the planned attempt is not very specific with which the exact segment. The question of categorization of forest management efforts in Malaysia can be answered by data obtained from experts and also some of the reports by the Ministry and NGOs that deal with forest development concerns. The findings also identified the relationship between each of the categorization of forest management efforts and the forest degradation issues. Based on these results, there exist relations between categorisations and the forest degradation issues. The results had traced the relations from the phases of Pre-NEP, NEP, NDP, and NVP as well. The results were also clear in showing the forest degradation issues trend changes through time. The approach of forest management efforts is parallel with forest degradation issues for each phase of development. Respondents are experts in this field, so they would know what and how to address forest degradation issues with the best approaches. Forest management effort is also known as the mechanism that should be integrated into the management system. The approaches are based on the total development in Malaysia for each phase of development. Tarrant, Cordell, and Green (2003) stated that excellent planning would bring about excellent implementation and operations into the projects. Implementation is the part when the formulated policies are put into action and integrated within the project lifecycle. These include the implementation of rules and regulations which

have been stated in the policies. After the operation is done, then the next step is carrying out the checking and correction to evaluate whether the arrangement has passed or failed. Checking is the important step for seeking out weaknesses. When weaknesses are detected, then the corrective actions should be applied as soon as possible to avoid any problems. Checking action is similar to monitoring and such an understanding of sustainable forest worldviews could assist the management to educate internal and external stakeholders on management zones and resource use; and assist in conflict resolution amongst users while developing effective policies, programmes, and implementation strategies.

Other developing countries also face the same situation like Malaysia. The relationship between forest degradation issues and the categorization efforts of forest management have been proven. The improvement is needed to solve forest degradation issues so that the aim of getting good quality environment could be achieved. There are relations between them, and it has given impact on quality of life for the humans. The failure to implement forest management efforts would give big negative impacts toward quality of human life. Malaysia has been planning toward achieving the status of a sustainable development country. The initial plan was established many years ago, with the ultimate aim of achieving such status by 2020. The main aim that needs to be achieved is when Malaysia is considered to be developed with a balanced development in terms of social, economics, and politics, and also good quality of life for the people. This aim seems not possible to be achieved if the problems of forest degradation issues still cannot be solved and the cases of forest degradation issues are not reduced based on the set targets.

The results found the impacts on quality of life caused by forest degradation issues. The enforcement of correcting environmental problems is an important step to solving the forest degradation issues. Otherwise, the forest degradation issues would still be at the same level or else would increase year by year. There are impacts on quality of life which had been listed by the interviewed experts, which include disturbing human health levels, disturbed livelihood activities, high risk of plunging economy, and increased social problems over time. According to a report by the United Nations, many products and technologies that have gone through this improvement process are raw material-intensive and energy-intensive industries which entail a substantial amount of pollution. The consequent impact on the environment is greater than ever before in human history.

To decrease the cases of forest degradation issues in Malaysia, the relevant authorities need to ensure that each single matter or issue is clear, and should give serious attention to those matters. To resolve the forest degradation issues in the fast track way is not an easy task. These studies also found strengths, weaknesses, opportunities, and constraints through the SWOC analysis. SWOC analysis is important to identify problems of the forest management so that the government could think wisely and practically for sustaining the Malaysian forestry. Objective four of this study is to identify the challenges in forest management related to forest resources development. SWOC analysis is one of analysis defined the challenges in forest management in Malaysia. The explanation has been discussed in chapter 5 which is in SWOC analysis part. As mentioned in chapter 1, this study had investigated forest management strategies, where the appraisal of strategies would give a good impact on

the policies set up by the country. Regardless of the roles and positions that participants hold, they need to give full support toward all the programmes and activities set up by the government in achieving the forest development goals aspired by the government. The strength of this appraisal is observed in Malaysia since it has rich natural resources in the forest. Based on these large amounts of forest resources, Malaysia should preserve and ensure that all these components of the environment are always monitored by them. Malaysia also had proposed and underlined the rules and regulations pertaining to environmental law. Based on previous research and observations, it has been recognised that Malaysia has taken serious action to ensure that the country's environment is always in check. Besides, Malaysia also has good networking with other countries as well.

Nevertheless, there are some weaknesses uncovered during this study. Among them is the level of compliance with the regulations that are in place; these policies should be obeyed by all parties involved in forest preservation and protection directly or indirectly. However, many of them did not follow through with these policies by adopting good implementation and monitoring processes. Instead, many of these regulations have been taken for granted. Some parties, including the industries, place greater priority on profit-making as compared to the negative repercussions that would come along with serious forest degradation issues. Moreover, the lack of good experts in certain fields is also another significant weakness noted during this study. A number of government ministries and departments that are attached to environmental tasks do not have enough expertise and capabilities to handle all the problems that crop up in relation to environmental care; hence they could not achieve these targets wisely.

Besides, some do not take seriously their role and responsibility toward forest development protection.

However, in spite of the revealed weaknesses, the result of the appraisal in terms of forest management strategies also indicated some opportunities. A management strategy is the best attempt to achieve the goals. In the past, as a developing country, Malaysia executed development efforts without taking serious considerations about their effects toward the environment in the future. Eventually when environmental implications started to effect on the economic and social well-being of the nation and its people, only then the country had stepped up by taking actions that demonstrated more concern about this matter. Although it is still not too late for Malaysia to preserve the surrounding environment, the enforcement should be enhanced so that pollution could be recovered and further cases in the future would not occur, thus applying more consistent and wise conservation and preservation strategies. On the other hand, these forest management strategies could also be collaborated with other developing countries, particularly to discuss the same problems and find ways to overcome forest degradation mutually facing all countries.

The constraint here refers to some problems that hinder the plans and objectives in the process of achieving goals. In the context of this study, identified constraints were concerned with the forest management strategies that still do not yield in aimed effects in the certain parts. This was found to be due to the lack of budget allocations to implement the targeted project objectives. If allocations are sufficient, they could do more research toward achieving a sustainable forest management; they could also buy the right equipment to overcome the arising forest degradation issues.

Besides that, research and past experiences had shown that environmental complications do not bear entirely isolated consequences. Constraints also involved cross-boundary issues. Environmental problems do not occur in only the country that is affected by it, but the aftermath would affect other nearby countries as well. For instance, if a neighbouring country experiences a particular air pollution phenomenon, the effects would be felt by other nearby countries because air constantly moves and shifts, and neither does it stay static at the same place or area, nor is it confined within national borders.

The challenges in forest development are identified because Forestry Research & Development (R&D) in Malaya came almost simultaneously along with the forest service during the colonial period. At that time, the motivation for R&D was primarily for resource conservation as the British experienced severe resource depletions. Silviculture was the initial scientific approach for forest management in the early days of forestry practices, aimed at increasing productivity of forest products, particularly timber. The aspects of research cover scientific, social and economic forestry and so on shaped the R&D activities. The emergence of the concept of sustainable forestry justified the increasing need for R&D in the forest sector.

#### **6.4 Effectiveness of the Existing Forest Management Strategies in Achieving Sustainable Development Goals**

The discussion about the forest management strategies and the efforts by the Malaysian government are the important part of tracing the deficiency of strategies or the weaknesses of management levels. Trend change pattern which shows up in the

timeline would show an increasing forest degradation issues year by year. The implementation of a mechanism has been proposed by the government has also been implemented, but weak enforcement is the big issue that should be considered for further improvement in order to avoid the negative impacts and effects are ever increasing without resolving the problems. Forest management is an important matter in many countries. As a Malaysia aims to achieve sustainable development by 2020, the vision is clear but the terms of sustainable development itself are still elusive and the achievement is still unclear. This part will discuss in-depth about the effectiveness of the existing forest management strategies in achieving sustainable development goals. Johari et al. (2012) stated that environmental pollution if left unchecked could contribute to the environmental degradation experienced globally.

Nevertheless, Malaysia has formed collaboration regarding forest degradation issues at various levels, including national, regional, and international. To achieve as a sustainable development country, Malaysia had listed the strategies to ensure this aim would be achieved. The government had lined up strategies since the promotion of the sustainable development nation stated in the Malaysia Plan reports. These strategies cover all environmental concerns in forest resource development. Strategies of development planning were revealed in the previous Chapter V, which described the forest degradation and the steps to solve those problems. Malaysia cannot only cater to forest degradation issues with their own ways but also need cooperation with the neighbour countries to sit together and discuss the best practical method to decrease environmental problems. Somehow, the problems do come from Malaysia itself, but they affect the neighbour countries as well. Donohoe (2003) stated that a multi-faceted

approach to the problems of environmental degradation and social injustice would include a shift from a throw-away economy to a reuse or recycle economy.

Apparently, strategies were underlined in development planning about forest degradation issues in Malaysia, which comprehensively covers all parts. Strategies cannot be effective if the implementation and enforcement processes are weak. The failure of managing of environment could give the negative impacts toward the surroundings. Many developing countries need information on the nature of the industry-based resource and environmental problems, on risks associated with certain processes and products, and on standards and other measures to protect the health and ensure environmental sustainability. They also need trained people to apply such information to local circumstances. International trade associations and labour unions should develop special environmental training programmes for developing countries and disseminate information on pollution control, waste minimisation, and emergency preparedness plans through local chapters. To achieve Sustainable Forest Management (SFM), Malaysia has committed to maintaining at least 50% of her land area under forest and tree cover in perpetuity as pledged under the 1992 Rio Earth Summit. This is attained through the protection of forests and the application of Sustainable Forest Management (SFM) practices like the statement by Omar & Hamzah (2012) said the Permanent Reserve Forest is being managed based on Sustainable Forest Management (SFM) principles and practices. Ultimately, this study focused on Malaysia for achieving the targets as a sustainable development (SD) country. SD has underlined the characteristics that should be fulfilled by a country in order to achieve the established goals. The United Nations World Commission on Environmental and

Development coined a definition of SD which is probably the most well-known in all of the sustainability literature, where sustainable development is, “development that meets the needs of the present without compromising the ability of future generations to meet their own need” (WCED, 1987). According to Adelina et al. (2004), sustainability is the process suggested to improve the quality of life within the limitations of the global environment. It involves solutions for improving human welfare that does not result in degrading the environment or impinging on the well-being of other people. Although there is no general agreement about the precise meaning of sustainability, there seems to be a general consensus that three basic concepts are involved in sustainable measures, which are living within certain limits of the earth’s capacity to maintain life; understanding the interconnections among economy, society, and environment; and maintaining a fair distribution of resources and opportunities for this generation and the next.

Based on these findings, the summary of expert opinion is that the majority of them were not confident that Malaysia could achieve their targets toward achieving sustainable development country status by 2020. A cohort of academicians firmly stated that Malaysia could not achieve the targets by 2020 and similarly for the cohorts of researchers, policymakers, the public, and project implementers as well. Nevertheless having said that, some of them thought perhaps it could happen, or otherwise because of some reasons. The term of SD is still elusive, and to achieve sustainability in the environment requires time and cooperation from all parties. The strain and responsibility could not be simply put on one party or side because environmental issues are big issues that need the full efforts of everyone to resolve the

problems. The interviewed experts gave an opinion that Malaysia could achieve the goal toward a sustainable development nation, but it would take more time to rearrange and improve the system of environmental management. Results by Costantini and Monni (2007) confirmed that human development should be the first objective of international development policies whereas an increase in human well-being is necessary to provide a sustainability path. Active participation of industrialised countries, following the general framework of the Millennium Development Goals, is one of the necessary conditions for successful development. Recent Prime Minister, Dato' Seri Najib stated that has clear targets and actions and timelines for implementation and calls for active participation by all stakeholders. He also outlined to scientist and policy makers a series of other measures taken by the Malaysian government to protect especially biodiversity within its own jurisdiction and through regional agreement. Report by FAO (2010) mentioned that sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels. Recent scientific assessments indicate that at least 60 percent of natural resources are being degraded globally due to human activity, most particularly those occurring during the last half-century (New Strait Times, 2016).

Each of the keywords proposed in this study is related to each other. The proof is evidenced by significant previous case studies which revealed similar findings. Some of the results are the same and some are not.

## **6.5 Conclusion**

Chapter VI has discussed in depth about the findings in Chapter V and the related studies in Chapter II. In this chapter, the discussion was based more on the continuity of the new findings in this study and the previous studies by other scholars, which are related to the prior studies. The discussion also refers to the previous studies which were discussed in Chapter II. The model was created based on the reference by other studies. The discussion is also guided by the description of the literature review framework.

## **CHAPTER 7: CONCLUSION**

### **7.1 Introduction**

In this chapter, the previous findings and the discussions shall be concluded by the terms that follow closely with the research objectives. The new ideas and contributions for the body of knowledge are also detailed in this chapter. The summary of results and discussion will be put in simple terms for those who prefer to get the gist of information about this study particularly. The findings covered all the limitations of this study within the scope of research. Each of the research questions are answered with guidance by the research framework formulated initially for this study. Contents of this research were also arranged with the standard formatting.

### **7.2 Summary of Chapter 1 to Chapter 6**

Chapter 1 has introduce the gist of this dissertation. The explanation of each section shows contents of all chapters. Each chapter explains in greater depth based on the categorisation and arrangement of topics. This chapter also focused on the surface of the research to present an idea about the aim of this study. For every point, the information provides directions of the entire path to answer the research questions and to achieve the research objectives for this study.

Meanwhile, for Chapter 2, the discussion more related to previous studies done by others researcher. In this part, each of keywords connected with research objectives were

discussed to get the figures of research flow. From the previous research, the research framework created to answered research questions particularly.

Then, Chapter 3 explained the method and techniques to analyse the data. Practical methods were used to fulfil all the objectives in this study. Combination of six analyses in this study could achieve the aims of research. This combination of analyses is compatible each other. The differentiation of techniques would present different results to add to the overall story. The primary and secondary sources of data are needed to ensure the diversity of results as well. Ultimately, the choice of method in research should be appropriate for achieving the research objective and answering the research questions as well.

Moreover, Chapter 4 had discussed about study region for this studies. Malaysia was chosen as the study area. The discussion is about Malaysia's area in terms of forest area in Malaysia.

Meanwhile, In Chapter 5, the focus is more on the results generated for each of the research questions that were stated in Chapter 1. There are four main research objectives, which need to be answered using the data acquisition, data analysis, and data presentation processes, as was stated in Chapter 3 previously. The continuity between Chapter 1 and Chapter 3, thus would complete Chapter 5 in displaying the results from the analysis. The findings were interpreted in the tables, and summarisations of interview data. Each section was explained in relation to the research objectives and research questions. In depth discussion of the results in this chapter will be done in Chapter 6.

Finally, Chapter 6 has discussed in depth about the findings in Chapter 5 and the related studies in Chapter 2. In this chapter, the discussion was based more on the continuity of the new findings in this study and the previous studies by other scholars, which are related with the prior studies. The discussion also refers to the previous studies which were discussed in Chapter 2. The model was created based on the reference by other studies. The discussion is also guided by the description on the literature review framework.

### **7.3 Environmental Resources and Forest Resources Development**

Through time, Malaysia slowly adopted different development directives with each different Prime Minister era. Each Prime Minister brought different ideas and plans in utilising environmental resources for development activities. The increasing population would result in increased demand for food, shelter, and utilities. Growth percentage was observed to increase year by year. This had prompted the government to take action by planning alternative solutions to solve the growing number of problems. Indicators of wealth, which is reflected by the quantity of resources available to a society, provide no or little information about the allocation of those resources. The timeline showed the trend change for each economic sector. The difference in percentage of growth is categorised by the different development plan periods, like colonial times, Pre-National Economic Plan (NEP), National Economic Plan (NEP), National Development Plan (NDP), and National Vision Planning (NVP). Each development plan had different styles of consumption of environmental resources, and that resulted in the different types of

environmental degradation issues. Despite the consumption matters of ERD are being affected toward the environment and will cause EDI, this had driven the Malaysian government to really make enhancements by integrating wise environmental planning into any development activities. The findings showed the trend of intensity and frequency of EDI in Malaysia from 1947 to 2014. The trends were observed different compared to each of the environmental components. Intensity and frequency of some event often occurred at the same time. That event refers to the situation of environmental degradation through the time. Based on the findings, Malaysia had the most frequently occurring degradation issues during the National Development Plan (NDP) phase. Same goes to the forest development situation in Malaysia. The National Forestry Programmes are holistically planned and implemented to enhance forest management practices, sustain forest health and eco-system services. The programmes look into the following aspects; forest resources management, environmental protection and socio-economic benefits from the forest to achieve sustainable forest management (SFM).

#### **7.4 Forest Management Strategies**

The cases in Forest Degradation Issues not only occurred in Malaysia, but other developing countries also faced the same problems, but the difference is either the cases are less or worst. Forest degradation issues in Malaysia are still under control because the government is generally putting their efforts to ensure any development activities are registered with the legal parties. Malaysia covers fourteen states in the Peninsular, Sabah, and Sarawak. Each state had forest resource areas with the different broadness. These

areas are under the respective states' responsibility to cater for the development projects. The findings also highlighted that forest degradation issues mostly occurred in the big cities, such as those in Johor, Pahang, Selangor, Sabah, and Sarawak. The cases of forest degradation issues are often compared to other states. This had happened as such because the economic activities are active and the states attract firms and industry players into the industrial and manufacturing sectors. The recommendation by experts, for improving the situation of forest management in Malaysia, is that there is a need to categorise the efforts so that every organisations could follow the plans clearly and in an arranged manner. Each of the stakeholders should take their position to support the government so that the attempts could facilitate the reduction of forest degradation issues. Cooperation between all the stakeholders could help the effort to come true as planned. Forest management effort is one of the most important factors that exhibit the government's perseverance and commitment toward decreasing the cases of forest degradation issues in Malaysia. 164 SFM standards from international processes and forest certification schemes which had been collected worldwide. They found that one cause of variation among standards was the geographical origin. Standards from developing countries had more emphasis on the social and economic aspects of sustainability, while standards from industrialised countries emphasised ecological forest functions more strongly. Efficient forest management and efficient enforcement of legislative requirements are prerequisites for effective certification of sustainable forest management. The efforts are already there but the management of the planned attempt is not very specific with the exact part. The relationship between forest degradation issues and the categorisation efforts of forest management have been proven. The improvement is needed to solve forest degradation

issues so that the aim of getting good quality management of the forest could be achieved. There are relations between them that would give the impact on quality of life for humans. The failures of implemented forest management efforts would largely negative impact toward quality of life.

### **7.5 Effectiveness of the Existing Forest Management Strategies in Sustainable Development Goals**

The trend change pattern showed in the timeline would illustrate the increasing Forest Degradation Issues year by year. The implementation of mechanism which was proposed by the government was also implemented, but the weak enforcement is the main issue that should be considered more for avoid the negative impacts and effects which are increasing without the solving of the problems. Forest management is the most important thing in any country. Since Malaysia aim to be able to achieve sustainable development status by 2020, the vision is clear but the terms of sustainable development itself is still elusive and the achievement is still unclear. The effectiveness of the forest management strategies was measured by the comparison with other developing countries. Comparison with the others would show the difference in utilised strategies in forest management. Strategies were underlined in the development planning about forest degradation issues in Malaysia, and it covers all parts. Strategies cannot be effective if the implementation and the enforcement are weak. The failure to manage the environment could give largely negative impacts towards the surroundings. After reviewing the summary of expert's opinion, the majority of them were not confident that Malaysia could achieve the targets for achieving sustainable development country status by 2020.

## **7.5 Conclusion**

Chapter 7 describes the conclusion for the whole study. The conclusion was based on the summarisation for each research objective. The summarisation basically answered all the research questions using simple explanation to make people understand deeply about Malaysia's forest management efforts toward achieving the sustainable development goals. Malaysia's efforts show that Malaysia is serious in its attempts to achieve sustainable development. Notwithstanding, SWOC analysis is a good benchmark to help policy makers to improve the forest management systems in Malaysia.

## REFERENCES

- Adelina Maria Mensah and Luciana Camargo Castro. 2004. Sustainable Resource Use & Sustainable development: A contradiction. University of Bonn. Germany.
- Albala-Bertrand, J.M. (1993). Political Economy of Large Natural Disasters. Oxford: Clarendon Press.
- Analysis, D. (2013). The SAGE Dictionary of Social Research Methods, 80–82.
- Anon. (1996). Committee to assess agro residues availability. INPAPER International 1(1): 13.
- Appanah, S., 1998. Management of natural forests. In: Appanah, S., Turnbull, J.M. (Eds.), A review of Dipterocarps: Taxonomy, Ecology and Silviculture. Center for International Forestry Research, Bogor, Indonesia, pp. 133–149.
- Badgie, D., Samah, M. A. A., Manaf, L. A., & Muda, A. B. (2012). Assessment of municipal solid waste composition in Malaysia: Management, practice, and challenges. Polish Journal of Environmental Studies, 21(3), 539–547.
- Bao, C., & Fang, C. (2013). Geographical and environmental perspectives for the sustainable development of renewable energy in urbanising China. Renewable and Sustainable Energy Reviews, 27, 464–474. doi:10.1016/j.rser.2013.07.008
- Barney, J. B. (1995). Looking inside for competitive advantage. The Academy of Management Executive, 9(4), 49–61.
- Barraclough, S. L., & Ghimire, K. B. (1996). Deforestation in Tanzania: beyond simplistic generalisations. The Ecologist, 26(3), 104–109.
- Ben J. Smith, Kwok Cho Tang and Don Nutbeam. (2006). WHO Health Promotion Glossary: new terms. World Health Organization. Geneva. Switzerland.
- Bernroider, E. (2002). Factors in SWOT analysis applied to micro, small to medium and large software enterprises: An Austrian study. European Management Journal, 20(5), 562–573.

- Boyle, J. (1998). Features cultural influences on implementing environmental impact assessment: Insights from Thailand, Indonesia, and Malaysia, 9255(97), 95–116.
- Brannen J. (1992). *Mixing methods: Qualitative and quantitative research theory and practice*. Avebury.
- Bruyninckx (2009). Environmental evaluation practices and the issue of scale, *New Directions for Evaluation* 122 (Environmental programme and policy evaluation: addressing methodological challenges) 31–39.
- Bryman (1988). *Quantity and quality in social research*. London: Allen and Unwin.
- By, S., Hussein, H. E. A., Of, P. R., & General, U. N. (2011). Malaysia Of The Millennium Summit At The Plenary Of The 66 Th United Nations General, (117).
- Capros, P., De Vita, A., Fragkos, P., Kouvaritakis, N., Paroussos, L., Fragkiadakis, K., ... Siskos, P. (2015). The impact of hydrocarbon resources and GDP growth assumptions for the evolution of the EU energy system for the medium and long term. *Energy Strategy Reviews*, 6, 64–79. doi:10.1016/j.esr.2015.03.003
- Chua, S. C., & Oh, T. H. (2011). Green progress and prospect in Malaysia. *Renewable and Sustainable Energy Reviews*, 15(6), 2850–2861. <http://doi.org/10.1016/j.rser.2011.03.008>
- Claver, E., López, M.D., Molina, J.F., Tari, J.J. (2007). Environmental management and firm performance: a case study. *Journal of Environmental Management* 84, 606–619
- Clive L.Splash. (1991). *Ecological Economics in Scotland*. International society for Ecological Economics Newsletter no 3 :3.
- Congress, L. (n.d.). *Developing Countries Contents*, 1–6.
- Costantini, V., & Monni, S. (2007). Environment, human development, and economic growth, 4. doi:10.1016/j.ecolecon.2007.05.011
- Costanza, R. (Editor), 1991. *Ecological Economics: The Science and Management of Sustainability*. Columbia University Press, New York, NY.
- CountryProfileMalaysiaForestry.pdf. (n.d.).

- Cranbrook, The Earl. 1988. *Key Environment: Malaysia*. Pegamon Press.
- Curkovic S, Sroufe R, Melnyk S. (2005). Identifying the factors which affect the decision to attain ISO 14000. *Energy* 30(8):1387–1407
- Cutter, S. L., B. J. Boruff and W. L. Shirley. (2003). "Social vulnerability to environmental hazards." *Social Science Quarterly* 84(1): 242-261.
- De Cian, E, I Keppo, S Carrara, K Schumacher, H Förster, J Abrell, M Hübler, J Bollen and S Paltsev (2013). European-led climate policy versus global mitigation action: Implications on trade, technology, and energy. *Climate Change Economics*, 4(4), 1350015.
- Department of Statistics. (2015). Malaysia: Kuala Lumpur.
- Department of Statistics. (2016). Malaysia: Kuala Lumpur.
- Derbishyre and Owen. (1997). Quaternary glacial history of the karakoram mountains and Northwest Himalayas. A review. *Quaternary International*, 6182(96), 85–102.
- Development, M. (n.d.). *No Title*.
- Dey. I. (1993). *Qualitative Data Analysis: A User Friendly Guide for Social Scientist*. Routledge, London.
- Donohoe, M.T. (2003). Violence and human right abuses developing world. *Medscape ob/Gyn and Women's Health* 8 (2).
- Dyson., R. (2004). Strategic development and SWOT analysis at the University of Warwick. *European Journal of Operational Research*, 152, 631–640.
- E. Galan, J.C. Fernandez – Caliani, I. Gonzalez, P. Aparicio, A. Romero. (2008). Influence of Geological setting on geochemical baselines of trace elements in soils. Application to soils of South West Spain. *Journal of Geochemical Exploration* 98. Elsevier.
- Economic Planning Unit. (2012). EPU Report. Malaysia: Kuala Lumpur.
- Economic Planning Unit. (2013). EPU Report. Malaysia: Kuala Lumpur.
- Ellen Churchill. (2005). Influences of Geographic Environment On the Basis of Ratzel's System of Anthro-Geography. ISO-8859-1

- El-Khishin, K. (2003). Building for “global city” status: A prescription for sustaining Cairo’s financial health. *Cities*, 20(2), 129–134.
- Elmar Kriegler & John P. Weyant & Geoffrey J. Blanford & Volker Krey & Leon Clarke & Jae Edmonds & Allen Fawcett & Gunnar Luderer & Keywan Riahi & Richard Richels & Steven K. Rose & Massimo Tavoni & Detlef P. van Vuuren. (2013). *The role of technology for achieving climate policy objectives: overview of the EMF 27 study on global technology and climate policy strategies*. Springer
- Eltayeb, T. K., Zailani, S. & Ramayah, T. (2011). “Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes”, *Resource, Conservation and Recycling*, 55, pp 495-506.
- EPA (U.S. Environmental Protection Agency) (2009). Evaluation of EPA’s temporally integrated monitoring of ecosystems (TIME) and long term monitoring (LTM) programmes. <http://www.epa.gov/evaluate/TIME-LTM%20Final%20Report.pdf>.
- Esty, D. C., & Ivanova, M. H. (2003). Globalisation and environmental protection: A global governance perspective table of contents. Yale Centre for Environmental Law and Policy, New Haven, CT, (October), 1–23.
- European Commission (EC). 2011. European Economic Forecast. European Union.
- FAO. 1991. *FAO Forest Products Yearbook, 1978-1989*. Rome. 336 pp.
- Ferraro, P. J. (2009). Counterfactual thinking and impact evaluation in environmental policy. *New Directions for Evaluation*, 122, 75–84.
- Fischer-Kowalski, M. (2011). Analyzing sustainability transitions as shifts between socio-metabolic regimes. In: *Environmental Innovation and Societal Transitions* (forthcoming).
- Fitzherbert EB, Struebig MJ, Morel A, Danielson F, Bruhl CA, Donald PF, Phalan B (2008) How will oil palm expansion affect biodiversity? *Trends Ecol Evol* 23:538–54
- Foo, K. Y. (2015). A vision on the opportunities , policies and coping strategies for the energy security and green energy development in Malaysia. *Renewable and Sustainable Energy Reviews*, 51, 1477–1498. doi:10.1016/j.rser.2015.07.041

Forestry Department Peninsular Malaysia Annual Report. 2008. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2009. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2010. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2011. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2012. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2013. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2014. Forestry Department, Kuala Lumpur.

Forestry Department Peninsular Malaysia Annual Report. 2015. Forestry Department, Kuala Lumpur.

Fraser, E.D.; Dougill, A.J.; Mabee, W.E.; Reed, M.; McAlpine, P. (2006): Bottom up and top down: Analysis of participatory processes for sustainability indicator identification as a 8 pathway to community empowerment and sustainable environmental management. In: *Journal of Environmental Management* 78 (2006), pp. 114 – 127.

Gallopín, G.C., (2003). A systemic synthesis of the relations between vulnerability, hazard, exposure and impact, aimed at policy identification. In: *Economic Commission for Latin American and the Caribbean (ECLAC). Handbook for Estimating the Socio-Economic and Environmental Effects of Disasters*. ECLAC, LC/MEX/G.S., Mexico, D.F.

Geeson, N., Quaranta, G., Salvia, R., & Brandt, J. (2015). Long-term involvement of stakeholders in research projects on desertification and land degradation: How has their perception of the issues changed and what strategies have emerged for

combating desertification? *Journal of Arid Environments*, 114, 124–133.  
doi:10.1016/j.jaridenv.2014.12.002

GEMI. (2001). *Environment: Value to the Top Line*. Washington, D.C

Goldstein, D. (2002). Theoretical perspectives on strategic environmental management. *Journal of Evolutionary Economics*, 12. doi:10.1007/s00191-002-0128-6

GPNM. (2003). *Green Purchasing Network Malaysia*. Malaysia.

Guarnacci, U.(2012). Governance for sustainable reconstruction after disasters: Lessons from Nias, Indonesia. *Environmental Development*, 2,73-85.

Gullison, R., & Hardner, J. (2009). Using limiting factors analysis to overcome the problem of long time horizons. *New Directions for Evaluation*, 122, 19–29.

Handfield, R.B., Walton, S.V., Seegers, L.K., Melnyk, S.A. (1997). Green value chain practices in the furniture industry. *Journal of Operations Management*, 15(4), 293-315.

Hansen, Potapov, Moore, Hnacher. (2013). *Google Earth Mapping*. University of Maryland.

Here, C., & Enter, T. O. (n.d.). *Malaysian Forestry Past , Present and the Future*.

Hezri, Adnan, Ahmad Kamal, Wasis, Gan, P. C. (2012). PDF

Hezri, A. (2013). Broadening the Environmental Dimension in the Post-2015 Development Agenda *IDS Bulletin* 44 (5-6), 81-88.

Hooi, K. K., Hassan, F., & Mat, M. C. (2012). An Exploratory Study of Readiness and Development of Green University Framework in Malaysia. *Procedia - Social and Behavioral Sciences*, 50(July), 525–536. doi:10.1016/j.sbspro.2012.08.056

Horton, B., Bird, M., Birkland, T., Cowie, S., Eong, O. J., Hawkes, A., ... Yasin, Z. (2008). Environmental and socioeconomic dynamics of the Indian Ocean tsunami in Penang, Malaysia. *Singapore Journal of Tropical Geography*, 29(3), 307–324. doi:10.1111/j.1467-9493.2008.00342.x

*Human Development Report*. (1996).

- Hunt, S. D., Sparkman, R. D., & Wilcox, J. B. (2011). Survey preliminary findings pre-test, 19(2), 269–273.
- Hussey, D. E., et al. (1997). Glossary of techniques for strategic analysis. *Strategic Change* 6, 97–115.
- Hyman, K. (2013). Urban infrastructure and natural resource flows: Evidence from Cape Town. *Science of The Total Environment*, 461-462, 839–845. doi:10.1016/j.scitotenv.2013.05.099
- Islamic Development Bank. (2011). The Challenge of Achieving the Millennium Development Goals in IDB Member Countries in the Post-Crisis World, (16), 104.
- Infrastructures, S. D., Information, S., Planning, S., & Management, L. (n.d.). Humans and environment: Cause and effect analysis supported by spatial data infrastructures Humans and Environment: Cause and Effect Analysis Supported by Spatial Data Infrastructures, (May 2012), 6–10.
- Inglis, J. (2008). Using human-environment theory to investigate human valuing in protected area management. *Tourism*.
- Institut Tadbiran Awam Negara (INTAN). 1994. *Wawasan 2020*. Kuala Lumpur.
- ITTO. 1998. Annual Report for 1998. ITTO. Chiang Mai, Thailand.
- Jackson, S. E., Joshi, A., & Erhardt, N. L. (2003). Recent research on team and organisational diversity: SWOT analysis and implications. *Journal of Management*, 29(6), 801–830.
- Jalonen, R., Hong, L. T., Lee, S. L., Loo, J., & Snook, L. (2014). Integrating genetic factors into management of tropical Asian production forests: A review of current knowledge. *Forest Ecology and Management*, 315, 191–201. <http://doi.org/10.1016/j.foreco.2013.12.011>
- Jamieson, Walter and Pallavi Mandke. (2000). “The Role of Urban Environmental Management in Resolving Urban Tourism Destination Management Problems”, in Conference Proceedings, *Tourism - A Strategic Industry in Asia and Pacific: Defining Problems and Creating Solutions*, Asia Pacific Tourism Association.
- Jan Dul and Tony Hak. (2008). *Case Study Methodology in Business Research*. Elsevier. USA.

- Jenkins, W. (2003). Sustainability theory. *Encyclopedia of Sustainability*, 380–384.
- Jeyamalar, K. (2005). *Nature and Nation: Forests and Development in Peninsular Malaysia*. Singapore: NIAS Press.
- Johari, A., Ahmed, S. I., Hashim, H., Alkali, H., & Ramli, M. (2012). Economic and environmental benefits of landfill gas from municipal solid waste in Malaysia. *Renewable and Sustainable Energy Reviews*, 16(5), 2907–2912. doi:10.1016/j.rser.2012.02.005
- Jong- Wha Lee. (2010). *A new Data set of Educational Attainment in the world*. Korea University.
- Jusoff, K. (2008). Sustainable Forest Management Practices and Environmental Protection in Malaysia. *Wseas Transactions On Environment And Development*, 4(3), 191–199. Retrieved From File:///C:/Lit Database/Jusoff/2008/Wseas Transactions On Environment And Development/Jusoff\_2008\_Sustainable Forest Management Practices and Environmental Protection in Malaysia.pdf
- Kamble, R. M. (2013). Impact of globalisation on human rights and environmental protection, 3(5), 3–6.
- Kandil, M. (2015). On the benefits of nominal appreciations: Contrasting evidence across developed and developing countries. *Borsa Istanbul Review*. doi:10.1016/j.bir.2015.06.003
- Kardes, F.R. and Kalyanaram, G. (1992). "Order of entry effects on consumer memory and judgement: An information integration perspective", *Journal of Marketing Research*, August, Vol. 29, pp.343-357
- Kate Gibson and Jessica M. Tierney. (2011). The evolution of environmental management systems: Some results from our survey. *Environmental Quality Management*. Volume 21, Issue 2, pages 27–36,
- Keene, M., & Pullin, A. S. (2011). Realising an effectiveness revolution in environmental management. *Journal of Environmental Management*, 92(9), 2130–5. doi:10.1016/j.jenvman.2011.03.035
- Kennedy, E. T., Balasubramanian, H., & Croose, W. E. M. (2009). Issues of scale and monitoring status and trends in biodiversity. *New Directions for Evaluation*, 122, 41–51.

- Kerry, A. M. (2007). Chapter 2 Approaches to, and concepts of, human-environment research.
- Knapp, G. J., & Kim, T. J. (1998). Environmental programme evaluation: Framing the subject. In G. J. Knapp, & T. J. Kim (Eds.), "Environmental programme evaluation: A primer". Chicago: University of Illinois Press, pp. 1–20.
- Kotler P. (1998). Marketing Management: Analysis, Planning , Implementation and Control. 6<sup>th</sup> Edition. Prentice- Hall International Edition.
- Kurtila, M., Pesonen, M., Kangas, J., & Kajanus, M. (2000). Utilising the analytic hierarchy process (AHP) in SWOT analysis – A hybrid method and its application to a forest-certification case. *Forest Policy and Economics* 1, 41–52.
- Larson, A.M. (2011). Forest tenure reform in the age of Climate Change: Lessons for REDD+. *Global Environmental Change* 21, 540-549.
- Laurence M. Ball. (2009). National Bureau of Economic Research. Working Paper. Cambridge.
- Lee, S. F., & Sai On Ko, A. (2000). Building balanced scorecard with SWOT analysis, and implementing "Sun Tzu's the art of business management strategies" on QFD methodology. *Managerial Auditing Journal*, 15(1/2), 68–76.
- Lewis, R. R., Milbrandt, E. C., Brown, B., Krauss, K. W., Rovai, A. S., Beever, J. W., & Flynn, L. L. (2016). Stress in mangrove forests: Early detection and preemptive rehabilitation are essential for future successful worldwide mangrove forest management. *Marine Pollution Bulletin*, 109(2), 764–771. <http://doi.org/10.1016/j.marpolbul.2016.03.006>
- Li, Y., & Oberheitmann, A. (2009). Challenges of rapid economic growth in China : Reconciling sustainable energy use, environmental stewardship and social development, 37, 1412–1422. doi:10.1016/j.enpol.2008.12.002
- Lieberman., Marvin B. and David B. Montgomery. (1988). First- Mover Advantages. *Strategic Management Journal*, (9).
- Lieberman, Marvin B., and David B. Montgomery. 1998. "First-mover (dis)advantages: Retrospective and link with the resource-based view." *Strategic Management Journal* 19:1111-1125.

- Locatelli, B.; Brockhaus, M.; Buck, A.; Thompson, I; Bahamondez, C.; Murdock, T.; Roberts, G.; Webbe, J. (2010). Forests and adaptation to climate change: challenges and opportunities. IUFRO, Vienna, Austria.
- Lofland, J. and Lofland, L.H. (1995). *Analysing Social Settings. A guide to Qualitative Observation and Analysis*. Wadsworth, Belmont, CA.
- Lozano, M., & Vallés, J. (2007). An analysis of the implementation of an environmental management system in a local public administration. *Journal of environmental management*, 82(4), 495–511. doi:10.1016/j.jenvman.2006.01.013
- Lutz, E. (ed). (1993). *Toward Improved Accounting for the Environment*. World Bank, Washington D.C.
- Majid-Cooke, F. (1995). The politics of sustained yield forest management in Malaysia: Constructing the boundaries of time, control and consent. *Geoforum*, 26(4), 445–458. [http://doi.org/10.1016/0016-7185\(95\)00043-7](http://doi.org/10.1016/0016-7185(95)00043-7)
- Malaysia. 1996. *The First Malaysia Plan, 1996-1970*. Government Printer, Kuala Lumpur.
- Malaysia. 1971a. *The Second Malaysia Plan, 1971-1975*. Government Printer, Kuala Lumpur.
- Malaysia. 1976. *The Third Malaysia Plan, 1976-1980*. National Printing Department, Kuala Lumpur.
- Malaysia. 1981. *The Fourth Malaysia Plan, 1981-1985*. National Printing Department, Kuala Lumpur.
- Malaysia. 1986. *The Fifth Malaysia Plan, 1986-1990*. National Printing Department, Kuala Lumpur.
- Malaysia. 1991b. *The Sixth Malaysia Plan, 1991-1995*. Government Printer, Kuala Lumpur.
- Malaysia. 1996. *The Seventh Malaysia Plan, 1996-2000*. Government Printer, Kuala Lumpur.
- Malaysia. 2001a. *The Eight Malaysia Plan, 2001-2005*. Government Printer, Kuala Lumpur.

- Malaysia. 2006. The Ninth Malaysia Plan 2006-2010. Government Printer, Kuala Lumpur.
- Malaysia. 2010. The Tenth Malaysia Plan 2011-2015. Government Printer, Kuala Lumpur.
- Malaysia Conference Proceedings, 1997. “Biodiversity Policy Reform Workshop”, 1997.
- Malaysia, Economic Report 1997/98.
- Malaysia, Ministry of International Trade & Industry, Website.
- Malaysia, Ministry of Agriculture, Website.
- McGillivray, M. (2008). What is Development? *International Development: Issues and Challenges*, 21–50.
- Melina, G., Yang, S.-C. S., & Zanna, L.-F. (2015). Debt sustainability, public investment, and natural resources in developing countries: The DIGNAR model. *Economic Modelling*. doi:10.1016/j.econmod.2015.10.007
- Melissa Leach, Robin Mearns And Ian Scoones. (1997). *Environmental Entitlements: Dynamics and Institutions in Community-Based Natural Resource Management*. Vol. 27, No. 2, pp. 225- 247.
- Mensah, A. M., & Castro, L. C. (2004). Sustainable resource use and sustainable development: A contradiction. Germany: University of Bonn.
- Mohd Hizamri, M.Y. 1993. *Kedinamikan dan kekayaan hutan Malaysia (Forest dynamic and biodiversity of Malaysian forests)*. Forestry Department paper at the Open Auditorium, Bukit Cahaya Seri Alam, Selangor, August 7, 1993. Malaysia.
- Mokhtar, M. B., & Ghani Aziz, S. A. B. A. (2003). Integrated coastal zone management using the ecosystems approach, some perspectives in Malaysia. *Ocean and Coastal Management*, 46(5), 407–419. doi:10.1016/S0964-5691(03)00015-2
- Moran, E. F., & Brond, E. S. (2013). Human-environment interactions, 1–24. doi:10.1007/978-94-007-4780-7

- Netherwood, A. (1998). Environmental management systems. *Corporate Environment Management*, 1(5), 35–58.
- Nielsen, L. (2013). How to classify countries based on their level of development. *Social Indicators Research*, 114(3), 1087–1107. doi:10.1007/s11205-012-0191-9
- Nerur S. P., Rasheed, A. A., & Natarajan, V. (2008). The intellectual structure of the strategic management field: An author co-citation analysis. *Strategic Management Journal*, 29(3), 319–336.
- Neuman W. L. (1997). *Social science methods: Qualitative and quantitative approaches*. Boston: Allyn and Bacon.
- Norman C. Ellstrand and Diane R. Elam. (1993). Population Genetic Consequences of Small Population Size: Implications for Plant Conservation. Ellstrand, pp 217-242.
- NRE. 2011. *Malaysia Second National Communication to the UNFCCC*. Ministry of Natural Resources and Environment. Putrajaya, Malaysia. Whitmore, T.C. 1975. *Tropical Rain Forests of the Far East*. Clarendon Press, Oxford.
- Omar, H. (2012). Overview of Redd + Activities in Malaysia. *5th GEOSS-AP Symposium*, (April). <http://doi.org/10.4028/www.scientific.net/AMM.695.792>
- Omar, H., & Hamzah, K. A. (2012). Aboveground Biomass and Carbon Stock Forest of Peninsular Malaysia Using L-Band Forest in Malaysia.
- Oon, W. W., Orini, H. N., & Weng Chuen Woon and Haron Norini. (2002). Trends in Malaysian Forest Policy. *Policy Trend Report*, 1–17.
- Panagiotou, G., & Van Wijene, R. (2005). The “telescopic observations” framework: An attainable strategic tool. *Marketing Intelligence and Planning*, 23(2), 155–171.
- Patton, M.Q. (2002). *Qualitative Research & Evaluation Method* (3<sup>rd</sup> edn.). Thousand Oaks, CA: Sage.
- Peh, K. S. H., De Jong, J., Sodhi, N. S., Lim, S. L. H., & Yap, C. A. M. (2005). Lowland rainforest avifauna and human disturbance: Persistence of primary forest birds in selectively logged forests and mixed-rural habitats of southern Peninsular Malaysia. *Biological Conservation*, 123(4), 489–505. <http://doi.org/10.1016/j.biocon.2005.01.010>
- Penh, P. (2010). Working Paper No . APFSOS II / WP / 2010 / 32, 1–24.
- Phillip Satalley. (2009). Can Trade Green China? Participation in the global economy and the environmental performance of Chinese firms. *Journal of Contemporary China*. Volume 18 Issue 61.

- Pinter, L., Almassy, D., Offerdahl, K., & Czunyi, S. (2015). Global Goals and the Environment: Progress and prospects, (May), 2.
- Points, K. E. Y. (2015). Malaysia: Country profile, 2006–2015.
- Primack, R.B. and Lovejoy, T.E. 1995. *Ecology, conservation and management of Southeast Asian Rainforests*. Yale University Press, New Haven and London, 5-13, 1927, 41-51.
- Putz, F.E., Zuidema, P.A., Synnott, T. et al. (2012) Sustaining conservation values in selectively logged tropical forests: the attained and the attainable. *Conserv. Lett.*, 5, 296-303.
- Proctor, T. (2002). Strategic marketing management for health management: Cross impact matrix and TOWS. *Journal of Management in Medicine*, 14(1), 47–56.
- Rankin, W. J. (2014). Sustainability. *Treatise on process metallurgy, Volume 3: Industrial processes (Vol. 3)*. Elsevier Ltd. doi:10.1016/B978-0-08-096988-6.00033-X
- Resources, G. (2014). Development goals, XXXIV, 20.
- Richard Makadok. (1998). Can first-mover and early-mover advantages be sustained in an industry with low barriers to entry/imitation?. *Strategic Management Journal*. Volume 19, Issue 7, pages 683–696, July 1998.
- Rinella, M. J., B. D. Maxwell, P. K. Fay, T. Weaver, and R. L. Sheley. (2009). Control effort exacerbates invasive species problem. *Ecological Applications* 19:155–162.
- Roberto Repetto, William Magrath, Michael Weels, Christine Beer, Fabrizio Rossini. (1987). *Wasting Assets: Natural Resources in the National Income Accounts*. World Resources Institute.
- Rob Kitchin and Nicholas J. Tate. (2000). *Conducting Research in Human Geography: Theory, Methodology and Practice*. Pearson Education Limited. United Kingdom.
- Roe, D. (2005). The Millennium Development Goals and conservation: managing nature's wealth for society's health. Retrieved from <http://www.eldis.org/cf/search/disp/docdisplay.cfm?doc=DOC16940&resource=f1>
- Ronda–Pupo and Luis Ángel. (2012). Dynamics of the evolution of the strategy concept 1962 2008: a co-word analysis. *Strategic Management Journal*, 33(2), 162-188. <http://dx.doi.org/10.1002/smj.948>
- Ruocco, P. and Proctor, T. (1994), “Strategic planning in practice”, *Marketing Intelligence & Planning*, Vol. 12 No. 9, pp. 24-9. [Google Scholar] [Link]

[Infotrieve]

- Sakai, S., Choy, Y. K., Kishimoto-Yamada, K., Takano, K. T., Ichikawa, M., Samejima, H., ... Itioka, T. (2016). Social and ecological factors associated with the use of non-timber forest products by people in rural Borneo. *Biological Conservation*, 204, 340–349. <http://doi.org/10.1016/j.biocon.2016.10.022>
- Satti, S. R., Jacobs, J. M., and Irmak, S. (2004). Agricultural water management in a humid region: sensitivity to climate, soil and crop parameters, *Agric. Water Manage.*, 70, 51–65.
- Sachs, J.D., Warner, A.M., (1995). revised 1997, 1999. Natural resource abundance and economic growth. National Bureau of Economic Research Working paper No. 5398, Cambridge, MA.
- Sachs, J.D., Warner, A.M., (1999). The big push, natural resource booms and growth. *Journal of Development Economics* 59, 43-76.
- Samantha Jones. (2002). A Framework for understanding on Farm Environmental Degradation and Constraints to the adoption of Soil Conservation Measures: Case Studies from Highland Tanzania and Thailand. University College Chichester. Bognor Regis, West Sussex. UK.
- Scholz, R. W., & Binder, C. R. (2003). Principles of human-environment systems (HES) research. *Transactions of the 2nd Biennial Meeting of the International Environmental Modelling and Software Society*, 2, 791–796.
- Scoones, I. (2000). Sustainable Rural Livelihoods a Framework for Analysis Ids.
- Sheraz, U. (2014). Foresight as a tool for sustainable development in natural resources : The case of mineral extraction in Afghanistan. *Resources Policy*, 39, 92–100. [doi:10.1016/j.resourpol.2014.01.001](https://doi.org/10.1016/j.resourpol.2014.01.001)
- Shifrin, N. S. (2005). Pollution Management in the twentieth Century. *Journal of Environmental Engineering*. 131: 676-691.
- Sorenson, L., Vidal, R. V. V., & Engstron, E. (2004). Using soft OR in a small company –The case of Kirby. *European Journal of Operational Research*, 152, 555–570.
- Srivastara, P. K., Kulshreshtha, K., Mohanty, C. S., Pushpangadan, P., & Singh, A., (2005). Stakeholder-based SWOT analysis for successful municipal solid waste management in Lucknow, India. *Waste Management*, 25(5), 531–537.
- Straughan, B. and Pollak, T. (2008). The Broader Movement: Nonprofit Environmental and Conservation Organizations, 1989-2005, Washington DC: National Centre for Charitable Statistics at the Urban Institute.

- Stupak Inge, I., Lattimore, B., Titus, B. D., & Tattersall Smith, C. (2011). Criteria and indicators for sustainable forest fuel production and harvesting: A review of current standards for sustainable forest management. *Biomass and Bioenergy*, 35(8), 3287–3308. <http://doi.org/10.1016/j.biombioe.2010.11.032>
- Sustainability, E. (2001). Globalisation and environmental sustainability, 259–289.
- Sutherland, W. J., Armstrong-Brown, S., Armsworth, P. R., Brereton, T., & Brickland, J. (2006). The identification of 100 ecological questions of high policy relevance in the UK. *Journal of Applied Ecology*, 43(4), 617–627.
- Szirmai, A. (2005). Developing countries and the concept of development.
- Talib, I. (2015). Overview of Forestry Sector in Peninsular Malaysia.
- Tarrant, M.A., Cordell, H.K., & Green, G.T. (2003). The Public Values of Forests Scale. *Journal of Forestry*, 101(6), 24-30
- Thang, H.C. 2009. *Malaysia Forestry Outlook Study*. Working Paper Series. Asia-Pacific Forestry Sector Outlook Study II (APFSOS). Bangkok. Thailand.
- Thomas, D. R. (2003). A general inductive approach for qualitative data analysis. *Population English Edition*, 27(2), 237–246. doi:10.1177/1098214005283748
- Trzyna, Ted. (2008). About Environmental Organization and Programs. California Institute of Public Affairs. Sacramento. California.
- United Nations. (2011). *The Millennium Development Goals at 2010-Malaysia*.
- United Nations (UN). (2015). The Millennium Development Goals Report 2015. Retrieved from [http://www.un.org/millenniumgoals/2015\\_MDG\\_Report/pdf/MDG 2015 rev \(July 1\).pdf](http://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%2015%20rev%20(July%201).pdf) Accessed 25th July 2016
- United Nations Development Programme (UNDP). (2005). *Achieving the Millennium Development Goals Economic Planning Unit*.
- United Nation, (n.d). Rio Declaration on Environment and Development 1992.
- United Nation Report. (1954). United Nation.
- UNEP. (1982).
- UNOPS (2015). 2014 annual statistical report on United Nations procurement.

- Vadlamannati, K. C., Ã, A. T., & Pin, J. (2009). Does higher economic and financial development lead to environmental degradation: Evidence from BRIC countries, 37, 246–253. doi:10.1016/j.enpol.2008.08.025
- Van der Ploeg, F., and S. Poelhekke. 2009. “Volatility and the Natural Resource Curse.” *Oxford Economic Papers* 61: 727–60.
- Van der Ploeg, F., 2011. Natural resources: Curse or blessing? *Journal of Economic Literature*, 49(2):366–420.
- Weihrich, H. (1982). The TOWS matrix: A tool for situational analysis. *Long Range Planning*, 15(2), 54–66.
- Weichselgartner, J. (2001). Disaster mitigation: the concept of vulnerability revisited, *Disaster Prevent. Manage.*, 10, 85–95.
- Whitmore, T.C. 1975. *Tropical Rain Forests of the Far East*. Clarendon Press, Oxford.
- Whitmore, T.C. 1975. *Tropical Rainforest of the Far East*. Oxford University Press, Walton Street, Oxford.
- Wheelen T.L and Hunger J.D. (1995). *Strategic Management and Business Policy*. 5<sup>th</sup> Edition. Addison Wesley. Reading. MA.
- Winter-Nelson, A. (1995). Natural resources, national income, and economic growth in Africa. *World Development*, 23(9), 1507–1519. doi:10.1016/0305-750X(95)00067-M
- World Development Indicators Database (2015). World Bank.
- World Commission on Environment and Development (WCED) (1987). *Our common future*. New York: Oxford University Press for the Brundtland Commission.
- Wu, W., & Niu, S. (2012). Evolutional analysis of coupling between population and resource-environment in China. *Procedia Environmental Sciences*, 12(2010), 793–801. doi:10.1016/j.proenv.2012.01.350
- Wyatt-Smith, J. and W.P. Panton. (1995). *Manual of Malayan silviculture for inland forest*. Malayan Forest Record No :23. Vol : 1 (second edition). Published by Forest Research Institute Malaysia.

- Yong Sc, Roversi P, Lilington J, Rodriguez F, Krehenbrik M, Zeldin OB et al. (2014). A Complex iron-calcium cofactor catalyzing Phosphotransfer Chemistry. *Science* 345: 1170 -1173.
- Zhang, K., & Wen, Z. (2008). Review and challenges of policies of environmental protection and sustainable development in China, 88, 1249–1261. doi:10.1016/j.jenvman.2007.06.019
- Zhu, Q., Cordeiro, J., & Sarkis, J. (2013). Institutional pressures, dynamic capabilities and environmental management systems: investigating the ISO 9000--environmental management system implementation linkage. *Journal of environmental management*, 114, 232–242. doi:10.1016/j.jenvman.2012.10.006
- Zsidisin, G.A. and Siferd, S.P. (2001). “Environmental purchasing: a framework for theory development”, *European Journal of Purchasing & Supplying Management*, Vol. 7, pp. 1-73.

## **Appendix**

### **Profile Respondents**

#### **Academician I**

Sex : Male

Age : 55 years

Position : Lecturer

Field  
Expertise : Environment and Development, Environmental Management,  
Public Participation and Involvement in Environmental Issue

#### **Academician II**

Sex : Male

Age : 56 years

Position : Lecturer

Field  
Expertise : Environmental economics, Sustainable Development, Sustainable  
Livelihood, Agricultural Economics, Sustainable Agriculture, Rural and  
Regional Development, Environmental Management, Greening the  
Economy, Sustainable Consumption and Production, Green Consumerism,  
Poverty and Environment.

### **Researcher I**

Sex : Male

Age : 60 years

Position : Researcher

Field

Expertise : Industrial Ecology, Environmental Management System,  
Waste Management, Ecosystem Health.

### **Researcher II**

Sex : Male

Age : 65 years

Position : Researcher

Field

Expertise : Environmental Geoscience, Natural Hazard and Climate Adaptation,  
Mineral Resources and Environment Management, Sustainability  
Science  
and Governance.

### **Project Implementer I**

Sex : Male

Age : 50 years

Position : Director

Field

Expertise : Project Management and Assessment and Human Resource division

### **Project Implementer II**

Sex : Male  
Age : 51 years  
Position : Managing Director  
Field  
Expertise : Environmental engineering, Project management

### **Policy Maker I**

Sex : Male  
Age : 50 years  
Position : Director  
Field  
Expertise : Project Planning and Management, Leadership

### **Policy Maker II**

Sex : Male  
Age : 52 years  
Position : Director  
Field  
Expertise : Environmental Planning, environmental monitoring,  
and environmental management

**Public I**

Sex : Male

Age : 75 years

Experiences : Retired man and has been working as a person who deals with environment almost 50 years.

**Public II**

Sex : Male

Age : 74 years

Experiences : Has been working as farmer and living in village for many years and had an experience with the agricultural development in Malaysia.