

**COMMUNITY AND CONSERVATION-SEA TURTLE CONSERVATION
IN SOUTHERN TERENGGANU, MALAYSIA**

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**FACULTY OF ARTS AND SOCIAL SCIENCES
UNIVERSITI MALAYA
KUALA LUMPUR
2016**

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IN SOUTHERN TERENGGANU, MALAYSIA**

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**THESIS SUBMITTED IN
FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY**

**FACULTY OF ARTS AND SOCIAL SCIENCES
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2016**

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ABSTRACT

This study is a sociological insight on sea turtle conservation in the State of Terengganu, Malaysia, with special emphasis on community based conservation programme practiced in Kerteh district in the Southern part of the state. Terengganu is known as one of the greatest nesting ground of sea turtles in the Asia-Pacific. Further, the state has a very long history of sea turtle conservation for more than four decades, even though the effort has not necessarily prevented drastic decline of the nesting numbers. In early 2000s, Malaysia's first community-based wildlife conservation project launched at Ma'daerah Sea Turtle Sanctuary located in Kerteh district.

The study regards conservation projects as a game among stakeholders embedded in a particular context of local economy. It tries to describe actual interest of the stakeholders behind existing conservation programme and how the stakeholders achieved consensus. In this connection, the study meticulously describes the context of local economy to understand why the actors choose a certain option and how the choices resulted in the existing conservation strategy. In the context of the State of Terengganu, the main stakeholders are state government, petrochemical industry, conservation NGOs, fishery administrators, and local fishermen. The existing strategy was adopted under dominant influence of petroleum industry. As a consequence, it failed to mitigate impacts

of drastic loss of nesting beaches due to rapid industrialisation of the coastal area of the State.

This study also attempts to present voice of underrepresented in a conservation project. Even though local fishermen are crucial stakeholder in sea turtle conservation, no serious assessment has been conducted on how they consider about sea turtle conservation. Lack of sincere inquiry toward fishermen's own vision led conservationists to a fixed idea as follows: fishermen are too ignorant and greedy to care for environment. Without enlightenment, they would never behave responsibly. This study challenges such assumptions by presenting actual voice of fishermen based on semi-structured interview in fishing villages. Modified Grounded Theory approach was applied to reconfigure the voices of fishermen. The study also identified factors, which would affect fishermen's behaviour toward sea turtle conservation, using multivariate analyses including Exploratory Factor Analysis, Analysis of Variance, and Path Analysis. These analysis revealed that the sense of crisis against degrading marine environment serves as a strong platform for fishermen's support for marine conservation. Further, the analysis showed that their civic moral to abide-by given rules trigger guilty feeling against by-captures. These result overrode negative assumption against fishermen's attitude toward conservation.

Abstrak

Kajian ini merupakan kajian sosiologi mengenai pemuliharaan spesies penyu di negeri Terengganu, Malaysia. Kaedah utama dalam cara pemuliharaan yang akan dibincangkan dikenali sebagai ‘community-based conservation’.

Negeri Terengganu agak terkenal sebagai kawasan penyu bertelur yang paling produktif di Semenanjung Malaysia. Tindakan untuk memulihara penyu pula diambil seawal tahun 1970-an. Namun begitu, usaha pemuliharaan penyu selama 40 tahun ini dilihat tidak begitu berkesan. Terengganu bukan sahaja mengalami kepupusan penyu belimbing, tetapi juga menghadapi kehilangan jenis-jenis penyu yang lain. Untuk mengatasi masalah ini, program pemuliharaan penyu di kawasan ini mengimplementasikan kaedah pemuliharaan yang baru, iaitu ‘community-based conservation’ sejak awal tahun 2000-an. Kawasan persantaian penyu yang terletak di Kerteh, Daerah Kemaman, menawarkan program berkonsep ‘community-based’ yang pertama sekali di Semenanjung Malaysia. Cara tersebut secara lazimnya menitikberatkan hubungan mesra di antara ahli pemuliharaan dan komuniti tempatan untuk mendapatkan sokongan daripada rakyat. Walau bagaimanapun, sampai sekarang tiada kajian yang menganalisa bagaimana pemikiran nelayan tempatan berkenaan dengan tindakan pemuliharaan.

Kajian ini bertujuan untuk mencuba mengatasi masalah ini. Pendapat nelayan-nelayan dikumpul melalui aktiviti ‘field work’ selama jangka masa setahun di Terengganu. Rakaman-rakaman temu ramah dianalisa dengan menggunakan kaedah ‘Modified Ground Theory Approach (MGTA)’. Selain itu, kaedah-kaedah analisa kuantitatif seperti ‘Exploratory Factor Analysis (EFA)’, ‘Analysis of Variance (ANOVA)’, dan ‘Path Analysis’ juga telah digunakan. Justeru itu, kajian ini telah berjaya menentukan faktor-faktor psikologi yang mempengaruhi sikap nelayan terhadap kegiatan pemuliharaan penyu. Kajian ini juga menunjukkan bahawa nelayan-nelayan sudah cukup menyokong tindakan pemuliharaan ekosistem laut kerana mereka risau dengan keadaan alam sekitar yang semakin merosot. Tambahan pula, nelayan-nelayan sudah bersikap mematuhi undang-undang dan berasa simpati terhadap penyu yang tertangkap di dalam pukut mereka. Oleh sebab itu, nelayan-nelayan ini sudah berhenti menggunakan pukut pari yang dilarang oleh kerajaan negeri.

Selain itu, kajian ini juga menjelaskan unsur-unsur politik dalam pemuliharaan penyu. Secara am, pemuliharaan boleh dikatakan adalah sejenis permainan politik di antara pemegang-pemegang saham. Kawasan yang disimpan dan cara ia diambil akan dipilih melalui interaksi di antara ahli-ahli ‘stake holder’. Keputusan ini memang menggambarkan politik dan ekonomi tempatan di kawasan tertentu. Oleh kerana itu, kajian ini menitikberatkan isu-isu ekonomi dan politik di belakang program pemuliharaan

yang sedia ada. Dalam konteks negeri Terengganu, industri petroleum paling berpengaruh dalam rancangan pemuliharaan penyu. Walaupun sebahagian besar pantai asli yang sesuai untuk penyu bertelur telah hilang disebabkan aktiviti perindustrian, ia boleh dilihat bahawa kurang tindakan yang diambil untuk mengatasi masalah ini. Program yang tertumpu kepada jenis nelayan yang tradisional dipilih sebagai suatu agenda politik. Kajian ini juga menjelaskan proses ini dengan merujuk kepada dokumen-dokumen sejarah.

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My gratitude also goes to other staff of the University. Associate Professor Dr Hanafi Hussin and Dr Mazlan gave me dedicated support when I suffered from some administrative problems. Dr. Kim Hyun Jyong was the only member of staff who came from the Far East. He acted as an older brother to me whom I could rely on.

I also would like to say many thanks to the experts from the Turtle and Marine Ecosystem Centre, WWF Malaysia, Malaysian Nature Society, and the Department of

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Finally, allow me to mention my family. My mother, Mitsue, allowed me to live as I wish. I must admit that launching a study on conservation in a tropical country in my thirties is something eccentric. Without her understanding, I might have given up this challenge. My last word of thankfulness goes to Sunu, a family member of mine, who passed away before the completion of this study. Here, I devote this study to him.

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CHAPTER 1: INTRODUCTION

1.1 Statement of the problem

How can we make conservation work? This is the agenda of the study.

Conservation is not a lucrative business. On the contrary, it tends to collide with more worldly interests and disputes between experts and local inhabitants stemming from conservation projects have been occurring for sometime. For instance, Greece has faced a series of ferocious conflicts between conservation experts and tourism operators. No conservation project can exist where there is a social vacuum. Instead, these projects must be firmly embedded in the local context where they are located. Further, as conservation projects normally require reducing human impacts on wildlife and their habitats, building a consensus with other stake holders to restrict their economic activities is crucial.

The study deals with such consensus-making. In other words, conservation may be likened to a political game in this sense. Participation of multiple stakeholders is required and these include conservation non-governmental organisations (NGOs), the local government, and representatives of major local industries; in order to achieve a consensus for the mitigation of hazards against endangered species or the ecosystem. The game is subject to local economy. In line with these view points, the study endeavours to describe the local economic context and the interests of stake holders. This study will also

discuss the local economic context pertaining to particular conservation projects. The main aim of this study is to determine how to make conservation acceptable for the local community. Biologists and administrative officers have regarded the local community as the main obstacle for conservation, whom are also the target of enlightenment, and a free source of labour force for conservation programmes. Interests of the local community had previously been ignored by conservation experts until recently. The indifference unfortunately resulted in hostility towards conservation activities, especially in developing nations. Since the early 1990s however, movements to alter conservation efforts to become more compatible with the interests of the local community have emerged. Being consonant with such movements, the study intends to investigate the interest of the local community and determine which factors encourage or discourage them from supporting conservation activities. In short, the study looks into how conservation can be considered attractive or at the least, acceptable for local fishermen.

The case studied here is Ma'daerah sanctuary which is located in the Kerteh district of the state of Terengganu, within the East Coast of Peninsular Malaysia. The sanctuary is one of the earliest projects in Peninsular Malaysia to declare a community-based management as its principle. Besides creating a round-table committee amongst stake holders and conservation experts, the project ambitiously attempts to foster eco-friendly ideas amongst local inhabitants and involve them in conservation practices.

1.2 Objectives

The study has four objectives which are discussed as follows. Firstly, the study tries to describe the actual interest of the stakeholders behind the existing conservation programme and how the stakeholders managed to achieve a consensus. Even though a great number of reports on the status quo of conservation projects currently exist, most of them fail to present or even purposely avoid describing the process of consensus-building amongst the engaged stakeholders. On the contrary, the studies tend to focus on analysing the power game amongst the players.

Secondly, the study describes the context of local economy. As mentioned earlier, the study considers a conservation project to be embedded in the context of local economy amongst stakeholders. A meticulous method of sourcing information is required to understand why the actors have chosen a certain option, and thus how these choices have resulted in the existing conservation strategy.

Thirdly, the study identifies the factors which would affect the behaviour of fishermen towards sea turtle conservation. It is assumed that certain psychological factors would motivate fishermen to behave responsibly, or prevent them from doing so. The study also pays great attention to opportunity cost; such as restrictions on traditional local businesses as the greatest potential impediment for fishermen to accept conservation

projects. From a sociological perspective, the study shall deny functionalistic views which tend to pay little attention to individuals, merely considering them to serve specific functions.

Fourthly, the study intends to reconfigure the voice of the people underrepresented in a conservation project. Even though fishermen are crucial stakeholders in sea turtle conservation, no serious assessment on their well-being has been conducted. The lack of sincere inquiry towards the vision of this community has unfortunately led conservationists to conclude that fishermen are too ignorant and greedy to care for the environment. Without being properly enlightened, they would never behave responsibly. Is this true? Using the methodology of qualitative behaviour science, the study tries to present the viewpoints of fishermen, and overcome lingered prejudice pertaining to fishermen accordingly.

1.3 Significance

As a wildlife conservation study, this study can contribute to the Malaysian conservation practice by suggesting keystones for consensus-building. Despite decades of history with regards to conservation efforts in the country, the social aspect has not drawn serious attention until recently. For instance, marine turtle conservation in Malaysia spans four decades of history, but almost no social science study pertaining to

this endeavour has existed. This study serves as one of the earliest social science studies to fill this vacuum and from here, it shall serve as the first step in terms of social science studies on the topic of conservation within the country. Furthermore, the study bears a unique significance because the Ma'derah sea turtle conservation project is the first attempt at community-based conservation in Peninsular Malaysia. Whilst the approach of this study has become mainstream in the conservation field nowadays, it will play an important role as the pilot study for conservation efforts in this arena in Malaysia. Given that Malaysia is a country of vast biological diversity, it bears great responsibility to protect her fauna and flora. The study will hopefully contribute to the successful protection of country's natural heritage.

As a social science study on sea turtle conservation, this is one of the most systematic studies ever conducted. As far as East and Southeast Asia is concerned, no serious academic work has been conducted in this field. Considering that Malaysia and Indonesia are one of the richest nesting grounds of sea turtles and the survival of these species in the Pacific region depends greatly on successful conservation efforts in these countries, the existing vacuum is deplorable. Based on the extended fieldwork, the study plays a crucial role in filling the aforementioned vacuum.

As a development study, its potential contribution is to pave a path for the application of a social-physiological method to a community-based project. Since the late 1990s, the

role of the community has been greatly stressed in development studies. Besides conservation, community-based programmes are conducted in various fields such as public health, education, and cultural heritage safeguarding. However, many programmes are designed from a functionalistic viewpoint. In other words, a typical community programme tends to be designed to mobilize community members to attain the interests of outsiders. Local communities have simply been considered as devices to help programmes function effectively or at the most, they have been a target for enlightenment. Whereby various community-based projects have failed to win the hearts of the local community, a diligent inquiry on the perception of its community-members is required to determine the reason for such indifference. The study shows how the relevant factors can be assumed.

1.4 Limitation

Several limitations of this study are identified in this subsection. Firstly, the biological argument is considered to be beyond the scope of this study. Even though the study theme discusses sea turtle conservation, the main target is not the endangered reptiles but the coastal society. Biologically accurate arguments regarding the dramatic decline of sea turtles in Peninsular Malaysia is determined by experts on marine biology. Secondly, due to resource restrictions, the geographical scope of this study is strictly

limited to the southern part of Terengganu. Furthermore, less than 100 informants were interviewed or surveyed. Studies encompassing the whole of Malaysia or the entire ASEAN region that will cover a far greater number of samples should be conducted by appropriate institutions in future.

Thirdly, the findings of this study could be highly gender-biased. Even though the bias is nothing but a natural consequence of the research focusing on Malay fishermen, another study to complement this limitation would be strongly encouraged. Fourth, the author had no opportunity to interview representatives of the petrochemical industry directly, although the author is keenly aware of the strong influence this industry has over sea turtle conservation efforts and the regional economy of Terengganu. Fourthly, conventional techniques for quantitative analysis were employed in this study. Certain up-to date methods were not applicable because they failed to present statistically robust findings due to data restriction.

1.5 Methodology

This study is comprised of three stages which include document surveying, fieldwork, and conducting a social survey. These three steps have enabled the author to propose, check and corroborate the original findings of the study.

First, hypotheses are formulated through observation and a semi-structured

interview conducted at the conservation site. Interviews conducted in fishery villages play a central role at this stage. Due to the lack of studies concerning socio-economic aspects of marine conservation in Malaysia, a qualitative pilot study was required at a very early stage of the study. The following steps aim to elaborate on the findings obtained in the first stage. Secondly, a document survey was conducted to gather qualitative information from official written records. Further, the various documents surveyed enable the author to describe the larger context of the studied project at Ma'daerah. Information on the economic status of Southern Terengganu, the major stakeholders and their interests, the history of disputes amongst the stakeholders, and past efforts to conserve sea turtles are extracted from the document survey process. Thirdly, the author conducted a social survey and quantitative analysis at the studied villages. The purpose of this quantitative analysis was to verify the hypotheses and models obtained through fieldwork conducted in the first step. The author also performed an exploratory analysis on the quantitative data to obtain alternative hypotheses based on the fieldwork carried out. Through the comparisons made, the author elaborated on the original findings obtained from the field study.

The fieldwork was conducted in Ma'daerah sea turtle sanctuary and two fishery villages, Kampong Labohang and Kampong Tengah, both of which are located in Kerteh. These villages are located within 5km of the sea turtle sanctuary. During the fieldwork

exercise, 24 fishermen were interviewed. This corresponds with the number of fisher households registered under the state fishery department. The interviews were conducted in a semi-structured manner. The interview records were coded systematically via the Modified Grounded Theory Approach (known as MGTA). Besides that, in depth interviews with 8 key informants were also conducted. The key informants refer to the officer from Department of Fisheries, facilitators of the WWF, a marine scientist from a local university, the head of a community organization, and the head of the regional fishermen's association.

The document survey reviewed materials such as white papers, policy working papers, reports of foreign consultants, conference minutes, presentation material for seminars, and legislation. The survey was conducted in the University of Malaya library, the archive of the Terengganu state economic planning unit, and in the resource room of the South East Asian Fishery Development Centre. The latter two institutions are located in Terengganu and the documents collected there include many unpublished materials which had been submitted directly to the local government. This first-hand material provides crucial information concerning the local context in which the project is embedded.

A social survey was also conducted at a Kerteh fishery village area. The author circulated questionnaires to 103 fishermen households which were registered on the list,

and was assisted by the turtle and marine eco-system research centre, a Terengganu-based public research institution. The questionnaire was composed of 25 Likert scale questions to testify and further elaborate on the set hypotheses. A total of 6 questions were concerning the attributes of the respondents. The author received 71 valid responses from the fishermen. The collected data was analysed through methods of cross tabulation, Analysis of Variance (ANOVA), Path Analysis, and Exploratory Factor Analysis (EFA). The methodology of this study is discussed in more detail in Chapter 3.

1.6 Geographic scope

This is a case study on a sea turtle sanctuary called Ma'daerah. It is the second sanctuary established in the state of Terengganu. The sanctuary is located approximately 6km north from the Kerteh fishery village zone (*Kawasan Nelayan Kerteh*) with coordinates 4°3 1'43.2"N 103°27'39.3"E, and adjoins the PETRONAS Petroleum Industry Complex (PPIC).

The author's main fieldwork was conducted at the sanctuary and the fishery area.



Figure 1.1: Location of Terengganu State

(Source: Google Maps <https://www.google.com.my/maps>; accessed December 10, 2015)

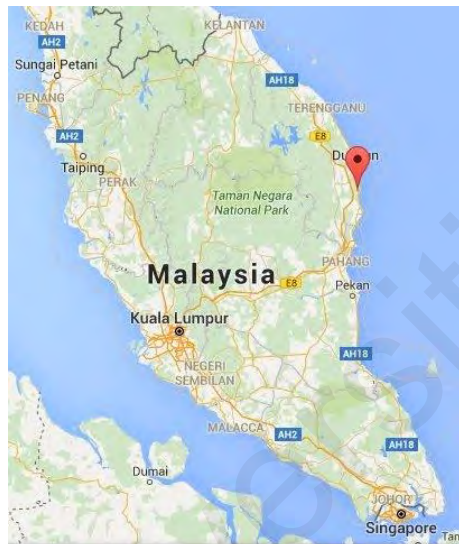


Figure 1.2: Location of Kerteh

(Source: Google Maps <https://www.google.com.my/maps>; accessed December 10, 2015)

Terengganu state is a state in the East Coast of Peninsular Malaysia. The state of Terengganu contains seven districts which all face the South China Sea except for the Hulu Terengganu district which lies in the inner territory. In the North to South direction, the six districts that currently exist are the Besut, Setiu, Kuala Terengganu, Marang, Dungun, and Kemaman districts. These six districts make up approximately 244 km of

shoreline in the state. Northern Terengganu refers to the Besut and Setiu districts; Middle Terengganu refers to the Kuala Terengganu and Marang districts; and Southern Terengganu refers to the Kemaman and Dungun districts. The focal point of the study is the Kemaman district which encompasses the Ma'daerah sea turtle sanctuary and the studied villages. Rantau Abang Sea turtle sanctuary, which used to be the only nesting beach of the Leatherback turtle in Asia, is located in the Dungun district, approximately 47 km northwards from Ma'daerah.

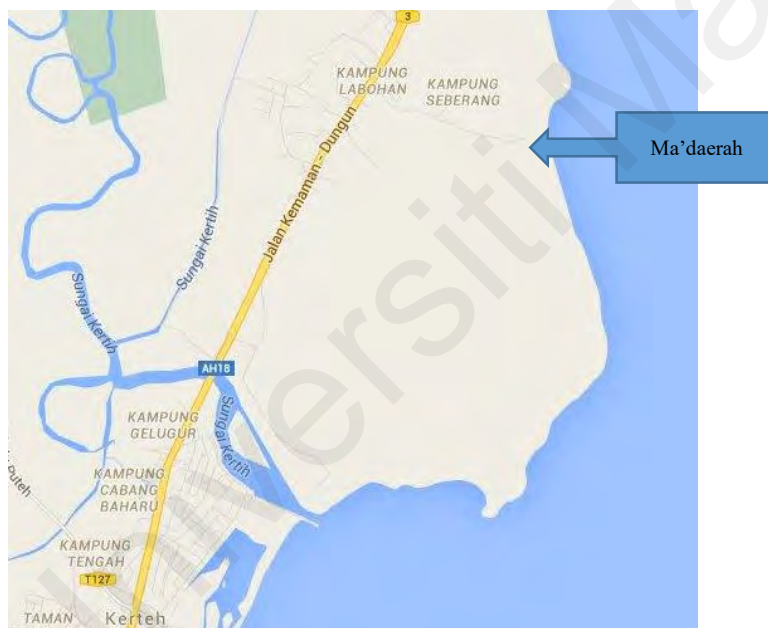


Figure 1.3 Location of Ma'daerah Sea Turtle Sanctuary and Fishery Villages

(Source: Google Maps <https://www.google.com.my/maps>; accessed December 10, 2015)

The sanctuary is a cove with a sandy shoreline spanning 1.7 km, located within the Paka-Kerteh rookery, and is flanked by the Paka River and the Kerteh River

(Department of Fisheries Malaysia, WWF-Malaysia, and BP Malaysia, 2004; 8-9). It obtained the turtle sanctuary status in 1999. Around the sanctuary, there are four main settlements - Kampong Labohan, Kampong Gulugor, Kampong Tengah, and Kampong Telaga Papan. Amongst these settlements, Kampong Labohan is slightly isolated compared to the others. The other three settlements share a small town called *Kawasan Nelayan Kerteh*. Kampong Labohan is located within a ten minute walking distance from the sanctuary. The other three settlements are located about 2km South of the sanctuary.

The salient feature of the region is that it is one of the largest petrochemical industrial zones in Peninsular Malaysia, and possibly the whole ASEAN region. Kerteh houses the only oil reserve in Peninsular Malaysia. It has easy access to centres of consumption owing to its strategic location. Pipelines starting from Kerteh even traverse all the way to the Klang Valley, Johor Bharu and Singapore (Petronas Gas Sdn Bhd, n.d.; 2, Chan systems, 1986). This advantage has spurred the petro-chemical industry in this region. The centre of a heavy industry corridor known as “the Petrochemical cluster” is located here. Combined with the Northern part of Pahang, the whole region of 80km length is now regarded as one of the most crucial industrial areas in the country (Malaysia, 2009; 13-14).

1.7 Composition

This study has seven chapters. From Chapters 2 to 4, it reviews basic information on sea turtles, literature and methodology. The original findings of the study will appear in Chapters 5 and 6. The final chapter shall present the conclusion of this study.

In Chapter 2, sea turtle conservation, will briefly summarize information on sea turtles as an introduction to the rest of the study. It is divided into several parts; the first section shows the actual status of the species in general and the second focuses on the situation in Malaysia. In both sections, the threats to turtles and conservation attempts are reviewed. Major conservation approaches comprising of legal, educational, and socio-economical approaches are also introduced. The third section describes the status quo of the sea turtle population and the legal framework for its conservation in Terengganu state.

Chapter 3, Literature Review, aims to review literature on conservation in general, and present a conceptual framework to the study; comprising six subsections. The chapter puts particular emphasis on the concept of 'Community-based conservation' as the key term of the entire study. In the first section, two philosophical viewpoints regarding conservation movements, the utilitarian and the preservationist, are introduced. The second section discusses the main economic and political questions entailing conservation activity. The central argument of this part is the opportunity cost of conservation, which has resulted in conflicts in protected areas all over the world. In the third section, concepts

of co-management and community-based conservation are discussed. The fourth section covers key issues in community-based conservation which includes the interests of the local community, strategic behaviour of local community, participation and conflict resolution. In this section, several cases of co-management and community management are critically reviewed. The fifth section reviews literature on sea turtle conservation in Malaysia as well as documents pertaining to the participation of the local community related to sea turtle conservation.

Chapter 4, Methodology, explains the operational procedure in data collection and data analysis in detail. Section 4.2 introduces the problem statement, which queries the lack of systematic research design in literature on sea turtle conservation. The next section presents the research design of the entire study. It explains the division of roles of the qualitative and quantitative parts of the study. In Section 4.4, data collection, the sampling strategy and the operational code for the collection of qualitative data is discussed. Subsequently, Section 4.5 is on the qualitative analysis, posing arguments on the sequence of semi-structured interviews and the procedure to analyse interview records in detail. The technique employed in the research is strongly based on the Modified Grounded Theory Approach. Following this, Section 4.6 discusses the quantitative analysis, introducing the questionnaire design and statistical methods used for analysis before the chapter is summarised.

Chapter 5 discusses the findings of this study regarding the context of the local economy and the consensus-building of the stake holders – dealing with how a consensus regarding sea turtle conservation in Southern Terengganu is built amongst stakeholders. The aim of the chapter is to illustrate a larger context to which the Ma'daerah project is embedded. The chapter is composed of seven subsections. Firstly, a description of the local economy of the Southern Terengganu arena is provided. The most important issue to be highlighted here is the dominant influence of the petrochemical industry. Next, the study explores what motivates the main stake holders to carry out marine conservation in Terengganu and the recent events that eventually led to the start of a community-based project in Ma'daerah. Three stakeholders dealt with here are the petrochemical industry, the fisheries sector, and the state government. Subsequently, the Rantau Abang Agreement is highlighted, and this study reviews the decisions made during a workshop on sea turtle conservation and management in Malaysia which was held between 14th and 17th December 1987. The sea turtle conservation strategy adopted during the meeting determined the direction of sea turtle conservation. The decisions adopted in the meeting have had a dominant influence on sea turtle conservation in the country until today. This section reviews how and why the stake holders achieved their decision. Next, Ma'daerah as the new model for conservation is critically revisited in this study, focusing on the project implemented in Ma'daerah sea turtle sanctuary. In short, the finding presented

here highlights that the project fails to build a good relationship with local fishermen. Following this, unsettled issues are discussed in this study, where the two main issues remain controversial - turtle egg collection, and eco-tourism. Finally, the findings presented in this chapter are summarised and discussed.

Chapter 6 covers the findings pertaining to the factors behind the behaviour of fishermen. Section 6.1, qualitative analysis, aims to elucidate the viewpoints of fishermen in terms of sea turtle conservation. Despite a strong emphasis on having a community-based feature, the Ma'daerah sea turtle conservation project has been conducted without a systematic survey on the fishermen's own opinions pertaining to conservation. Whilst some key informants consider fishermen to be completely alien to the concept of conservation, it is still unclear to what degree fishermen have so far accepted this idea and how much their viewpoints differ from those of conservationists. Additionally, fishermen have been an underrepresented stakeholder in the decision-making process. Even though fishery officers have participated at roundtables, it remains unclear if their policies are in harmony with the vision of fishermen. Is there any discrepancy between the officers and fishermen in terms of economic interests? This section aims to answer such questions.

Section 6.2 is divided into four sub-sections. The first subsection which is on sea turtles, describes how fishermen consider the species. To what degree are they aware of

its endangered status? What do they regard as the main cause of their decline? What are opportunity costs and potential benefits of sea turtle conservation to fishermen? Do they empathise with the reptile? The second subsection deals with the perception of fishermen towards themselves. Two concepts, a sense of victimisation and a sense of powerlessness will be presented here. The third subsection focuses on the relationship between the managing parties and fishermen. It points out that the fishermen acknowledge the necessity of marine environment management, yet their tendency to depend on the government hampers their acceptance of community-based programmes. The fourth subsection presents the viewpoints of fishermen regarding turtle egg consumption. It explains why fishermen feel a much lower sense of guilt in consuming turtle eggs than the use of gill nets, even though both trigger the decline of turtles.

Section 6.3 covers quantitative analyses, and aims at elaborating the findings of the previous section. The statistical methods used here are cross-tabulation, Exploratory Factor Analysis, analysis of variation, and Path Analysis. The first subsection shows personal attributes of the respondents. Cross-tabulation will be applied to identify features of the samples. The second subsection explains how the findings of the qualitative analysis are converted into variables and statistical models. This subsection prepares a sub-sequential analysis to be conducted in the next three subsections. The third subsection performs an Exploratory Factor Analysis (EFA). The purpose of this analysis is to identify

the latent psychological factors that give impacts on the attitude of fishermen towards conservation. The factors identified through this analysis are also used as variables to be examined in the fourth and fifth subsections. The fourth subsection examines how personal attributes mentioned in the first subsection affect personal attitudes towards conservation. The fifth subsection testifies the major hypotheses of the qualitative analysis. The final section discusses the findings of the chapter.

Chapter 7 is the conclusion, whereby the findings of the entire study are summarised, and their significance and limitations are discussed.

1.8 Definitions of key terms

This section presents the definitions of key words that appear frequently and are crucial to this study. The eleven words defined here are: 'Conservation', 'Community', 'Conservancy' or 'Conservationist', 'Consensus', 'Acceptance', 'Passive resistance', 'Conflict', 'Cost', 'Stake holder', 'Expert', and 'Local fishermen'.

1.8.1 Conservation

Accurate definitions of conservation can be found in the text of international conventions. The study adopts the definition from the Convention on the Conservation of Migratory Species of Wild Animals. Article 1, Paragraph1 (b)-(c) of the Convention

defines "Conservation Status" as follows¹.

- b) "Conservation status of a migratory species" means the sum of the influences acting on the migratory species that may affect its long-term distribution and abundance;
- c) "Conservation status" will be taken as "favorable" when:
 - (1) Population dynamics data indicate that the migratory species is maintaining itself on a long-term basis as a viable component of its ecosystems;
 - (2) The range of the migratory species is neither currently being reduced, nor is likely to be reduced on a long-term basis;
 - (3) There is, and will be in the foreseeable future, sufficient habitat to maintain the population of the migratory species on a long-term basis; and
 - (4) The distribution and abundance of the migratory species approach historic coverage and levels to the extent that potentially suitable ecosystems exist and to the extent consistent with wise wildlife management;
- d) "Conservation Status" will be taken as "unfavorable" if any of the conditions set out in sub-paragraph c) of this paragraph is not met.

Therefore, conservation in this study means endeavours of any institute, organization and individual to achieve favourable conservation status cited above.

¹ Convention on the Conservation of Migratory Species of Wild Animals, <http://www.cms.int/en/legalinstrument/cms> accessed 15th August 2014

1.8.2 Community

According to Murfree (1994; 410), Community refers to social units with members who interact directly and have a collective identity both self-defined and other-defined. The term community here assumes a primary relationship. It is deemed to have group norms, which are upheld mainly through peer pressure amongst their members. These criteria require certain limits in terms of membership and spatial extent. Thus, communities usually have a spatial dimension, and the term community-level and local-level are used interchangeably. Even though the word can refer to a group of people with particular attribute(s), “community” in this study always requires clear geographical locality. Therefore, the word is irrelevant in terms of ethnicity.

1.8.3 Conservancy and Conservationist

Even though these two words are not synonyms in dictionary definitions, the study uses them as de facto synonyms. The broader definitions of these terms involve institutions, organizations, or individuals that promote, plan and implement conservation projects. The narrow definitions of these terms involve organizations whose mandate is conservation, and the staff of such organizations.

1.8.4 Politics, Political, and Political Ecology

Cambridge online dictionary defines politics as “the relationships within a group or

organization that allow particular people to have power over others” and defines political as “relating to politics”².

Political ecology refers to study of the relationships between political, economic and social factors with environmental issues and changes. Bryant and Bailey (1997, 2) states that the goal of political ecology is “to understand the possibilities for action by actors appearing within broader political and economic structure” .

1.8.5 Consensus

Cambridge online dictionary defines the term as “a generally accepted opinion or decision among a group of people”³. Even if a decision might be accepted as a result of compromise of relevant parties, the study considers such a decision to be a consensus. In other words, a consensus in this study is a form of equilibrium attained amongst the relevant parties.

1.8.6 Acceptance

Dictionary definitions of the word are as follows⁴:

² Cambridge University, Online British English Dictionary, <http://dictionary.cambridge.org/dictionary/british/>, accessed 15th August 2014

³ Cambridge University, Online British English Dictionary, <http://dictionary.cambridge.org/dictionary/british/>, accessed 15th August 2014

⁴ Cambridge University, Online British English Dictionary, <http://dictionary.cambridge.org/dictionary/british/>, accessed 15th August 2014

- (1) General agreement that something is satisfactory or right, or that someone should be included in a group;
- (2) The act of agreeing to an offer, plan, or invitation; and
- (3) The fact of accepting a difficult or unpleasant situation.

The study uses the word with the nuance of the third definition. The study considers conservation programmes to be accepted by the local community as long as it does not result in apparent hostility if the project is not strongly supported by the people.

1.8.7 Passive resistance

In dictionary definitions, passive resistance is defined as “the act of showing you oppose something in a peaceful way rather than using violence”⁵. The passive resistance in this context nonetheless reflects the theory presented by James Scott in his book titled “*Weapons of the Weak: Everyday Forms of Peasant Resistance*” (Scott, 1987). Through his fieldwork in paddy villages in Malaysia, Scott demonstrated how ordinary, powerless people in repressive societies can still manage to influence policies through actions such as sabotage, feigned ignorance, foot-dragging, and gossip. According to him, peasants are engaged in a silent struggle against rich land owners to define changes in land tenure, mechanization and employment to advance their own interests. Similar actions or

⁵ Cambridge University, Online British English Dictionary, <http://dictionary.cambridge.org/dictionary/british/>, accessed 15th August 2014)

attitudes of fishermen as a result of frustration or indifference to conservation are defined as passive resistance in this study.

1.8.8 Conflict

Dictionary definitions of the word are as follows⁶:

- (1) An active disagreement between people with opposing opinions or principles;
and
- (2) Fighting between two or more groups of people or countries.

In this study, conflict means an active disagreement or fighting between conservancy and another stakeholder(s). The study considers a conservancy and another stake holder to be conflicting when explicit protests against conservation, abusive verbal speech directly addressed to conservancy, violent protests of a party such as the demolition of facilities, and litigation against a party can be observed or reported. The study envisages a continuum starting from acceptance to conflict in due course from the increasing frustration of a stakeholder.

⁶ Cambridge University, Online British English Dictionary, <http://dictionary.cambridge.org/dictionary/british/>, accessed 15th August 2014

1.8.9 Cost

In this study, cost refers to something that is given, needed, or lost in order to exercise conservation. Therefore, it does not necessarily relate to money. It can also refer to time and effort devoted to or given up for the sake of conservation. This usage originates from British utilitarianism and commonly appears in microeconomics.

1.8.10 Stake holders

A stake holder refers to party who has an interest in the success of conservation. Post, Preston and Sachs (2002) defined a stakeholder as “A person, group or organization that has interest or concern in an organization. Stakeholders can affect or be affected by the organization's actions, objectives and policies”. As a conservation project does not necessarily entail a tangible organization, this study alters “organisation” to “project” and adopts the definition.

1.8.11 Expert

An expert in the study mainly refers to biologists, but is not restricted to academics. Government officers and NGO staffs with biological knowledge are also deemed to be experts. In most cases, the study uses this word interchangeably with conservationists. More precisely, however, the two words are not synonyms because conservationist can

include activist and rangers without having the expertise.

1.8.12 Local Fishermen

Local fishermen refers to the individuals who live in vicinal villages of a marine protected area or sanctuary, and regularly operate fishery in the neighbouring marine area.

In chapter 5 and 6, this word particularly refers to Malaysians who live in the fishery villages neighbouring the Ma'derah sea turtle sanctuary and operate traditional, small-scale coastal fishery.

CHAPTER 2: SEA TURTLE CONSERVATION

2.1 Introduction

This chapter summarizes information on sea turtles as an introduction to the rest of the study. It is divided into several sections; the first section shows actual status of the species in general. The second focuses on the current situation in Malaysia, and the third section narrows down its focus on sea turtles in Terengganu. In each section, the threats to turtles and the conservation attempts are reviewed. Major conservation approaches being legal, educational, and socio-economical are also introduced.

2.2 Sea turtles in the world

This section provides a narration of the current status of sea turtles, the main factors threatening their survival, and the conservation measures to tackle these threats. Presently, all species of sea turtles are endangered. The drastic decline is caused by the combination of various factors such as turtle hunting, turtle egg collection, coastal development, poorly managed conservation projects, and water debris. Measures to mitigate these problems can be classified primarily as biological, legal, educational and socio-economic measures. The core interest of this study is on educational and socio-economic measures.

2.1.1 Current Status

Sea turtles have seven species; the green turtle (*Chelonia mydas*), the leatherback (*Dermochelys coriacea*), the hawksbill (*Eretmochelys imbricate*), the logger-head turtle (*Caretta caretta*), the kemp's turtles (*Lepidochelys kempi*), the olive ridley (*Lepidochelys Olivacea*), and the flat-back turtle (*Chelonia depressa*). They are all listed on the IUCN red list of threatened species and six of them, except for the flat-back turtle, are listed as endangered migrant species on the Convention of Migrant Species of Wild Animals website⁷ (). In the discussion about the danger that turtles face, three main factors need to be considered - geographical concentration of nesting grounds, local socio-economic condition of nesting sites, and time-lag of human activity affecting the turtle population.

First of all, the areas which sea turtles nest on are very limited, although they are considered migrant species. Ross (1982) indicated that more than 84 percent of nesting activities from the logger-head turtle, the olive ridley, and leatherback turtles are concentrated on a handful of specific nesting grounds. The leatherback turtle was found to have more than one thousand nests on only four beaches in the world from the survey conducted by Ross that was later published⁸. This highlights the fact that human activities at these geographically limited areas can impact the sea turtle population significantly.

⁷ Convention of Migrant Species of Wild Animals Annex 1, http://www.cms.int/sites/default/files/instrument/appendices_e.pdf, accessed August 10, 2014

⁸ There are several nesting grounds that have been found and documented since Ross published his survey. Irian Jaya, documented by Suganuma, Kamezaki, and Tanaka (1999) is one of them.

Second, regions where these nesting grounds are located have variable socio-economic conditions. Without giving serious consideration towards the socio-economic conditions of each site, recommendations from a biological viewpoint would lose their tangibility. For instance, the green turtle nesting areas in the Gulf of Mexico and the Caribbean Islands would mean that both the southern parts of the United States and Eastern Nicaragua are equally important for conservation, although their economic conditions greatly differ.

Third, it is very difficult to estimate the effects of human activities and this includes conservation efforts for sea turtle population. This is because turtles have long life spans and require decades to mature. For example, the Kemp turtle in Mexico has declined despite serious efforts and strict regulations set for their conservation. Pritchard (1982) indicated that this decline comes from systematic harvesting of their eggs for decades before conservation activities actually commenced. From his studies, Pritchard also pointed out that the recovery of the Massau islands turtle population in Papua New Guinea is subsequent to the prohibition of turtle meat consumption for four decades; upon religious conversion of its inhabitants⁹. In short, the condition of the sea turtle population tends to indicate effects from past human activities. Therefore, this emphasises the careful consideration that has to be made before we can properly estimate effects of conservation.

⁹ Seventh day Adventist church recently replaced traditional belief in part of Papua New Guinea.

2.1.2 Threats

As mentioned earlier, sea turtles are seriously endangered. What are factors threatening them? This section briefly introduces threats discussed in the reviewed literature.

Threats to sea turtles can be categorised as natural threats, and anthropogenic threats. Natural threats involve predation by other species, fungal or bacterial infection, and erosion of nesting beaches. Anthropogenic threats vary greatly from turtle hunts to water debris. This study focuses on anthropogenic threats as it is not meant to be a biological study.

Turtle hunting is commonly observed in various regions. For instance, the Vezo community in southern Madagascar, the Seychellois community in Seychelles and the Reunion Island, the Tamil community in south India and Sri Lanka, and the Caroline Islanders in the Federation of Micronesia are well-known as turtle hunters (Hildebrand, 1982; 441, McCoy, 1982). In the most extreme case, Miskito in Nicaragua were found to obtain 70 percent of their protein intake from sea turtles (Nietshhmann, 1982). Rampant poverty amongst fishery communities also has a tendency to trigger the illegal capture of sea turtles. The illegal hunting activities in Africa is commonly documented (Siakor *et al* 2000, Muir, 2004, Okemwa *et al*, 2004, Bal *et al*, 2007, Dossa *et al*, 2007). Policy change may result in poverty and consequentially instigate a higher demand for turtles. Kapurusinghe (2000) stated that fishermen in southern Sri Lanka started harvesting sea

turtles only after their income had declined steeply as a result of shell collection prohibition imposed by the government.

Turtle meat consumption is not a universal phenomenon and this is mainly due to religious prohibition¹⁰, with the exception of their eggs which are more widely harvested as food. Suganuma and Yusuf (1999) conducted an empirical research in Segamat Islands in the Java Sea. This research involved counting the number of body pits of hawksbill turtles and green turtles at 15 nesting beaches. With obvious signs of natural hatchlings, the body pits are excavated and the contents are evaluated for clutch survival by counting egg shells, unhatched eggs, and dead hatchlings. It was reported that only two egg clutches hatched naturally from 2000 body pits, accounting for over 100000 laid eggs in the 15 rookeries surveyed. Most of the nests had been collected by local community. This intensive exploitation is the main cause of the drastic decline of regional sea turtle populations, declining to less than a quarter of its population in a single decade.

Turtles are systematically hunted not only for local consumption, but also for commercial purposes. In the south eastern part of the United States, turtles were hunted and manufactured for canned soup and leather items to export to Europe¹¹. In Indonesia and the Philippines, shells of the hawksbill turtles served as a form of currency until the late 1970's; where the shells had been exported to Japan, Hong Kong, and Taiwan as

¹⁰ Consumption of turtle meat is prohibited under Islam and Judaism.

¹¹ Consommé of sea turtle is a well-known French delicacy.

material for handy craft. In this trade, Malaysia and Singapore played an active role as transit ports (Mack, Duplaix, and Wells, 1982; 546)¹².

By-catch is also a serious threat for sea turtles. It means accidental capture of marine animals in fishing gears. In the 1980s and 1990s, the by-catch of dolphins in purse sine nets and of sea birds in long line nets provoked criticism (Bache, 2000). The by-catch of sea turtles is a widely documented phenomenon. The operation of trawlers has also caused a serious by-catch problem. Hillestad, Richardson, McVea, and Watson indicate that shrimp trawlers in south eastern United States has greatly influenced the population of the Logger heads and the Kemps in the Mexican gulf. The negative impact of trawling is also reported in India (Patnail and Kar, 2000), Sri Lanka (Amarasooriya, 2000) and Malaysia (Motmier, 1982). Other fishing gears such as Japanese long line-nets targeting tuna¹³, and Australian set nets targeting sharks near bathing beaches (Hillestad *et al*, 1982) also frequently capture sea turtles.

The construction of buildings and roads along the coastal line, without saying, also deprives turtles of beaches to nest. In addition, artificial lights on shorelines pose as a disturbance for turtles for two main reasons; it repels female turtles from beaches, and

¹² Tortoise shell crafts have their origin in Chinese culture, and Japanese preference on these items is under its influence. Tortoise shells valued highly under pre-modern commerce too. We should note active role of local Chinese and their networks in tortoise shell trade in Southeast Asia.

¹³ Tuna fishing has special position in Japanese fishery because of its high profitability. Hence, criticism toward Japanese by-catch of the leather back turtle provokes serious concern of Japanese fishery industry. The Fishery Agency of Japan financially assists conservation of the leatherback turtles in Irian Jaya, Indonesia to mitigate international pressure on t line net.

prevents hatchlings from heading to the ocean (Witherington, 2000). In South East Asia, the negative impact of these factors is especially severe because of the dramatic economic growth in the past few decades. The growth of coastal tourism also gives notable impact on sea turtles. Phuket Island in Thailand gives us the best example of uncontrolled tourism development and the loss of habitats for sea turtles.

Mismanagement issues in conservation efforts ironically leads to a decline in sea turtle population. A hatchery managed improperly fails to reproduce hatchlings. For instance, it is reported that performance of logger-head turtle hatchery in Omaezaki, central Japan, was too poor to maintain population. Little attention had been paid against insect predation and fungal infection (Everlasting nature Asia, 1995). Chan found that on average 30 percent of the eggs within a clutch were infertile in Rantau Abang leatherback hatchery (Chan *op.cit.*). It is also known that mismanagement of a hatchery results in a gender bias of the hatchlings. Gender of sea turtles depends on the temperature of sands during their incubation (Morreale *et al*, 1982). Around thirty degrees is considered a 'pivotal temperature' for their gender distribution (Mrosovsky and Yntema, 1982). Tiwol and Cabanban (2000) showed green turtle eggs incubated in the open-air hatchery resulted in all female hatchings during warm, dry conditions based on their experiments in Pulau Gulisaan, an island off Sabah, Malaysia. This tells us that improper management of a hatchery may cause considerable bias on the gender distribution of a population.

Marine debris in adjacent water of nesting beaches or hatcheries is also a factor to affect turtles (Motmier, *op.cit*, Amarsooriya, *op.cit.*). Chan (Chan, *op.cit.*) reported that many turtles have choked to death as they preyed on plastic debris and oil balls confusing them with jelly fish¹⁴.

2.1.3 Conservation measures

Several measures attempt to tackle the threats as discussed above. This section reviews existing conservation measures and their limitations. The measures can be divided into biological, legal, educational, and socio-economical approaches.

2.1.3.1 Biological approach

Hatchery activities are widely conducted to save sea turtle eggs from predators. Hatcheries are also required on eroded beaches. Ehrenfeld (1982) stresses the necessity of hatcheries on beaches where natural hatchling rate is low or non-existent. Reserving natural beaches for nesting sanctuaries is one of the simplest, yet most effective ways to conserve sea turtles. As mentioned before, several species of sea turtles have a natural tendency to nest in geographically limited areas. Further, once a sanctuary has been assigned on solid biological grounds, it requires much less effort for monitoring than to

¹⁴ Dissection of the stranding, or dead marine animals ashore, can partly tell us their cause of death. Some stranding sea turtles with plastics filled in their respiratory tracks, stomachs might be choked. In an extreme case, the author saw two large buckets full of plastics found from a dead logger head turtle.

monitor potential aquatic habitats of vast width. This justifies the establishment of sanctuaries. However, these sanctuaries need to be designated based on biological grounds, and the identification of beaches or habitats for the population is crucial. In addition to this, their boundaries should have sufficient ecological reasoning.

2.1.3.2 Legal Approach

Legal frameworks mould conservation efforts. International conventions especially are of great significance. Firstly, as a principal of international conventions, signatory countries are required to implement domestic regulations. Secondly, international conventions contribute to conservation at the boundaries of a country. This bears great significance for turtle migration. At the international stage, there are three important conventions that affect sea turtle conservation - the Law of the Sea Treaty, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (hereafter, CITES), and the Convention of Migrant Species of Wild animals (hereafter, CMS).

The Sea Treaty establishes an exclusive economic zone of 200 nautical miles from the baseline of a country. According to the principal of sovereignty, all marine resources including marine wildlife are under the exclusive jurisdiction of the coastal country. This can result in a difficult situation as far as conservation efforts are concerned. Conservation efforts or regulations pertaining to conservation of a specific country can be offset by less

than proper actions or much looser regulations of another country on migration routes¹⁵.

CITES was designed to prevent the extinction of endangered species and to improve their status by strictly controlling international commerce of the listed species, their derivative parts, and the products derived from them. There are three categories named Appendices I, II, and III with a list of relevant species. Species listed in Appendix I are regarded as threatened with extinction, those listed in Appendix II are regarded as potentially threatened without regulation of trade, and species listed in Appendix III are under the regulation of a particular party of the convention. Appendix I lists six of seven species of sea turtles which are the green turtle, the leatherback, the hawksbill, the logger-head turtle, the Kemp's turtle, and the olive ridley. This greatly discourages the international trade of turtle shells and leather that has been active until the 1970s.

CMS stipulates that parties shall endeavour; a) to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction; b) to prevent, remove, compensate for or minimise, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; c) to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species,

¹⁵ Even though it is not directly related with sea turtles, a fact to note here is that internal water including estuaries and lagoons are legally considered as land. Consequently, a coastal country can exploit them freely without another international convention to bind them. For instance, the Ramsar Conventions is one of such international conventions.

including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species (Article III Paragraph 4). Further, as a range state¹⁶ of Sea turtles, Malaysia should “inform the Conference of the Parties through the Secretariat on measures that they are taking to implement the provisions of this Convention for these species” (Article VI, Paragraph 3).

Having grasped the framework, this discussion shall be divided into more practical points. The most fundamental issue here is the possibility of extinction of sea turtles even when there are regulations to protect them – Third World countries included. In a biological sense, a time lag in population dynamics partially accounts for the discrepancy. Nonetheless, in a sociological sense, this can be explained as a disfunction of the regulations. What deprives the leverage of the set regulations are low levels of enforcement, an inadequacy of regulations, and the disobedience of people. Low levels of enforcement lead to a fatal problem for conservation in developing countries. Geographically saying, island countries like Indonesia, the Philippines, and the Federated States of Micronesia suffer a great disadvantage in terms of enforcement. The reality is, agencies in such countries do not have sufficient staff to manage their entire jurisdiction. Furthermore, severe budget restrictions are common problems faced by the administration in Third World countries. A government might not be able to even

¹⁶ The Convention define “Range” as “ all the areas of land or water that a migratory species inhabits, stays in temporary, crosses or overflies at any time on its normal migration route”. Range State thus means “any State that exercise jurisdiction over any part of the range of the migratory species.

purchase enough cars, boats, or fuel¹⁷.

In addition, the regulations in question themselves could be inadequate. Gomez (1982) pointed out that conservation laws in several countries do not cover turtle eggs and it is seldom that countries have regulations to protect their habitat. One of the difficulties faced pertaining to habitat protection is setting the boundary of the reserve because it also means legitimizing human activities on land, beaches, and lagoons adjoining sanctuaries (Shabica, 1982). If the size of the reserve is inadequate, the establishment of reserves may ignite more negative impacts on the survival of protected species. Lack of biological expertise and the high demand for land development tends to lead countries to conduct a lax form of assessment, which eventually results in reserves too small to maintain the ecological integrity of the habitat¹⁸ as well as being unable to cover major nesting areas (Ehrenfeld, 1982; 453). Adequacy should also be examined in terms of penalty severity. The lack of penalties results in subsequent offences pertaining to the relevant regulations. As a result, one would choose to pay a small fine during the occasional crackdown, rather than to withdraw from poaching activities.

¹⁷ The republic of Palau presents us an extreme example of lack of tangible enforcement of its conservation law. The Micronesian country, known as one of the best diving destinations, manifested complete prohibition of shark fin hunt in its entire Exclusive Economic Zone, which is as large as 680 thousand square kilometers. However, the bureau of marine resources of the country has only one small boat and a handful of staff. A fundamental problem was that the population of the country is only twenty thousand and it is unrealistic to employ enough staff to monitor its water. What the island country actually attempts is winning the hearts of citizens in English speaking countries to promote tourism.

¹⁸ For further detail concerning ecological integrity, see Natural England (2010).

The third point refers to levels of obedience of people, which is the central concern of this research. Gomez (*op.cit.*) claimed that uneducated people do not understand, or are unaware of new conservation regulations promulgated by their government. However, apart from such an innocent form of indifference, intentional offences occur on a frequent basis too. Local inhabitants under severe economic pressure would rather break conservation laws than face starvation. The inhabitants, if not under actual survival needs or being on the edge of hunger, may also commit poaching offences to obtain additional income, or consume wild foods which they traditionally prefer. Further, various activities are practiced for their social needs¹⁹.

Having reviewed these three factors, a question emerges; what are measures to overcome such disfunctions? Improving enforcement measures naturally requires more funding and staff. However, its realization depends upon the general economic condition of a country up to a certain degree. This leaves the issue beyond control of conservancies. Thus, the study will focus on obedience, which can be improved through educational and socio-economic approaches.

2.1.3.3 Educational approach

An educational approach complements the legal approach. It aims to instil spontaneous obedience of regulations, instead of relying on enforcement. It includes the

¹⁹ Ornaments made from parts of particular marine wildlife manifests high social rank of the owner. Under custom of the Republic of Palau, only traditional chiefs are allowed to wear wristlets made from horn of Dugongs.

use of advertisements, mass media campaigns, dissemination of biological knowledge, and direct persuasion of stake holders. NGOs prefer this approach mainly due to the small cost for implementation. Wallace, Kristin, and Salvador (2000) stress the significance of community meetings as an avenue to share biological knowledge about sea turtles and their protected status with fishermen.

Nada (2001) presents a different avenue for persuading people. He explains the following information to several members of the Coptic Church in Alexandria to make them stop consuming turtle meat and blood:

- a. The importance of saving sea turtles in terms of biodiversity;
- b. The prohibition of the sea turtle trade in international and national laws;
- c. Religious views of killing an endangered species and blood consumption;
- d. Positive impacts that turtles have on the tourism industry;
- e. Hazards of drinking turtle blood on human health.

According to him, religious discourses had outstanding leverage for convicting them.

Nearly two-thirds of fishermen agreed to stop turtle hunting purely for religious reasons, whilst the combination of looking after biodiversity, health and tourism could only make up 26 percent of the community. This result teaches us the importance of strategy in

moulding the context of a society.

As reviewed, education is a path to raise awareness of people. It could work especially well if a campaign identifies the proper targets to approach; and the contents of the delivered messages are consistent with the interest of the target group.

2.1.3.4 Socioeconomic approach

A socioeconomic approach in this context refers to small projects that affect the local economy around the turtle nesting beach. NGOs usually play major roles using this approach. It is applicable to particular, small communities and therefore, a small geographical coverage is its major limitation.

In Segamat Island, Indonesia, an NGO named Everlasting Nature of Asia tries to protect sea turtles by purchasing turtle eggs from local fishermen, who are former illegal diggers. The organization also employs them as observers of nesting beaches in Segamat islands and Monperant islands. The same method of conservation of leatherback turtles in Irian Jaya has been adopted (Suganuma, Kamezaki, and Tanaka, 1999)²⁰.

A more sophisticated version of the socio-economic approach is combined with educational programmes so that they complement each other. A conservation project in Rakwa village, Southern Sri Lanka, is one of the best known examples. It offers programmes including research, exhibitions, workshops, turtle watching, educational

²⁰ It should be noted that there exists severe criticism toward this approach because the project would merely lead the local community to obtain an income instead of fostering a genuine sense of conservation.

sessions, adult English language classes, and has a medical centre (Kapurusinge, 2000).

Its basic concept is that that turtle hunters in the village will either go against the project or start exploiting other resources unless the project provides them with an alternative source of income. Biological research activities employ former illegal diggers as done in the Indonesian case. The Sri Lankan project further raises its funds partly from turtle watch programmes. The villagers enjoy opportunities to improve their language skills and eventually serve as guides. Another example is Project Tamar Ibama in Almafola, Brazil (Marcovaldi and Marcovaldi, 1999; 35-41, Marcovaldi *et al*, 2000) which offers both educational and socio-economic programmes. For educational purposes, the NGO conducts seminars for local teachers, activities for school children, and constant exhibition in a local museum which they built. For economic assistance, the NGO provides opportunities such as handy craft making and working in a communal garden for the villagers. In addition, the NGO runs a kindergarten for the local community.

Even though these cases seem very attractive, two important points remain unclear in the documents. Firstly, the documents did not mention how these projects involved the local community during its early stage. Although the present success of the projects is introduced, the past process of community involvement should have been meticulously described along with the identification of keystones that contributed to these successful results. Secondly, the documents did not mention any conflict pertaining to the project,

even though it is unrealistic to make the assumption that the villagers unanimously appreciated the project. For instance, some villagers may be running businesses which go against conservation efforts. The potential conflicts between villagers and stake holders should be assessed more often as conservation projects tend not to cover the entire village economic life.

2.2 Malaysian Sea turtles

This part summarizes information about sea turtles in Malaysia. Malaysia once enjoyed its fame as one of the richest nesting grounds in the Western Pacific. The east coast of Peninsular Malaysia especially has been of great significance because it is the only nesting ground of the leatherback turtle in the Asia-Pacific region. However, the decrease of the population of this species has been proceeding very rapidly despite the government's efforts to protect it. This section reviews the current status, threats, and conservation measures concerning Malaysian sea turtles.

2.2.1. Current Status

Presently, four out of seven species of sea turtles live in Malaysian waters. These are the green turtle, the leatherback, the hawksbill, and the olive ridley. Generally speaking, the east coast of Peninsular Malaysia and Borneo enjoy much more abundant turtle egg nesting than the west coast of the Peninsular. Different geological features of

the coastal area partially explain the gap between the east coast and west coast. The east coast faces the west South China Sea and receives strong northeast monsoon. As a result, the beaches are sandy and wide, providing excellent nesting grounds for sea turtles. Facing the narrow Malacca Strait, the west coast is generally flat and muddy, having dense mangrove and dense mangrove frontage. The largest nesting numbers have been recorded in Terengganu, followed by Sabah and Sarawak. These three states far exceed the rest of the country in terms of nesting number. A small number of turtles nest in Pahang, Johor, Perak, Kedah, Penang and Malacca.

According to Chan (1991; pp.121-125), beaches indicated in Table 2.1 below are critical for the Malaysian sea turtle population:

Table 2.1: Nesting Beachs of Crucial Importance in the Peninsular Malaysia

EAST COAST	mainland	islands
Terengganu	Rantau Abang, Penarak, Cukai, Kerteh	Pulau Perhentian Besar, Pulau Redang
Pahang	Pantai Cherating, Pantai Keracut	
Johor		Pulau Simbang, Pulau Lima, Pulau Pemanggil, Pulau Mertag
WEST COAST	mainland	islands
Perak	Pantai Remis	
Melaka	Telok Belanga	Pulau Kenet

(Source: Drawn by Author based on Chan (1991; pp.121-125).

2.2.2 Threats

There is no unique threat reported that occurs specifically in Malaysia. However,

some of the threats appear in drastic ways in the country. Egg harvesting in the country was once conducted very intensively. In the past three decades, rapid economic growth of the nation has resulted in drastic land development in some major rookeries.

Sea turtle eggs harvested were approaching 100 percent for many decades (Chan, *op.cit.*). Harvests from rookeries close to markets provide good additional income for fishermen. The State government could earn revenue from bidding egg collection licenses (Ibrahim and Sharma, 2006, Siow, 1987; 2). Local Chinese businessmen once traded turtle eggs as an aphrodisiac to meet the aggressive demand in Hong Kong.

By-catch is also a serious threat to Malaysian sea turtles. Two traditional fishing gears; meshed gill nets for the capture of rays (*Pukat Pari*) and sunken fish-traps (*Bubu*) have been severely criticised as threats to leatherback turtles (Economic Planning Unit Terengganu and Department of Fisheries Malaysia, 1987; 3, Siow, *op cit*; 7-14). While these gears have been used for the subsistence of coastal fishery, large-scale commercialised boats such as prawn trawlers, also frequently result in the by-catch of sea turtles. The rapid mechanisation of fishery and promulgation of artificial fibre has magnified impacts of their operation. As improved chemical fibres increased the strength of nets, entanglement with fishing nets became increasingly lethal for turtles. It is noted that the Malaysian government has not made it obligatory for trawling boats to be

equipped with turtle exclusive devices (TEDs)²¹. Rahayu Zulkifli, the project manager of Ma'derah sea turtle sanctuary commented on this point as follows:

I think basically all vessels need TEDs so that they might not kill turtles accidentally. I think you can cut away rates of mortality of turtles. Hopefully, in the future we can realize²².

All the by-catch in Malaysia happens because we still don't implement compatible fishing gears for them. For example in some places they use turtle exclusive devices, here they don't. For example, trawl boats, here they call pukat tunda, catch everything from the bedrock of the corals reefs and turtles are pulled down and drowned. But if they would set exclusive devices, it would end. Making it compulsive to sell turtle exclusive devices with nets, this could save turtles²³.

In addition, the Japanese demand for hawksbill shells had critically motivated the turtle hunting industry in Sabah before CITES came into force. Even after Malaysia signed CITES, stuffed turtles were still domestically sold as souvenirs.

Land development also caused critical damage to sea turtles in Malaysia. Because of dramatic economic development of the country in the past three decades, many important rookeries have dissipated. Rookeries in mainland Terengganu present the worst case of habitat loss resulting from industrial development. Further, Pulau Pinang, Pulau

²¹ For further detail about TED, refer to the United States National Marine Fisheries Service (National Marine Fisheries Service, *TED regulations*: <http://www.sefsc.noaa.gov/labs/mississippi/ted/regulations.htm>, Accessed August 10, 2014)

²² Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

²³ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

Langkawi, Pulau Redang, and Pulau Perhentian have all turned into tourist areas with bright artificial lights. More nesting beaches potentially face the threat of tourism development because sandy beaches serve as tropical tourism.

The impact of water debris is also reported. Accidental predation of plastic film used for consumer packaging, polyethylene terephthalate (PET) bottles, and containers for food can suffocate turtles. The use of these items has rapidly increased since their domestic production started.

Considering the migrant nature of sea turtles, transgressions in neighbouring countries can affect the nesting numbers in Malaysia. Unfortunately, sea turtles are severely threatened, especially in Indonesia. Suarez (Suarez, 2000) conducted a research in Kay islands, Eastern Indonesia and also admitted that there was a radical decrease in the animal's population. He found that the local custom law, *Adat*, which allows only eight villages in the region to hunt leatherbacks, had lost its binding authority especially on the younger generation. In addition to these, a great demand from the expanding Balinese market has considerable impact on tradition that has kept most of Indonesians from hunting adult and sub adult turtles. Polunin and Naitaja (1982; 355-356) describe the Balinese situation in detail. According to them, turtle fishing for the Balinese Market is evidently covering a larger area since the local turtle population around Bali were seriously depleted by the 1950s²⁴.

²⁴ The turtle fishers in Bali are not only Balinese based in the villages of Tanjung Benoa and Seranagan in South Bali, but also

2.2.3 Conservation measures

Malaysia has paid great attention in protecting sea turtles especially in terms of regulations. Turtles have been under legal protection for five decades in some states. Hatcheries also started their operations several decades ago. This section briefly summarizes these past efforts.

2.2.3.1 Biological approach

Turtle sanctuaries have been established in Terengganu (Rantau Abang, Ma'derah, and Pulau Redang), Sabah (Turtle Islands National Park), Sarawak (Pulau Salang-Tatang), and Pahang (Cherating, Teluk Sri Intan). Furthermore, hatcheries have been set up in Malacca (Pulau Upeh), Penang (Pantai Kerachut), and Pahang (Pulau Tioman).

Among them, sanctuaries and hatcheries in Terengganu, Sabah, and Sarawak have had long histories. Hatcheries were opened in 1949 in Sarawak, in 1961 for both Terengganu and Kulantan, in 1966 in Sabah, and in 1971 in Pahang. However, the operations of past hatcheries are seriously blamed for low hatching rates, gender biased hatchlings, and underestimation of proportion required to sustain the turtle population (Chan, *op.cit*, Tiwol and Cabanban, *op.cit*).

Buginese from Sulawesi, and other ethnic fishermen from Nusantara Minor archipelago. The turtle fishery activities cover areas such as southern and eastern Kalimantan, Sulawesi, Sumbawa, and Flores. In places such as Sumbawa, turtles are often caught by the local community and kept alive to be sold to fishermen travelling to Bali later on.

2.2.3.2 Legal approach

As far as legislation is concerned, Malaysia has paid significant attention to sea turtle conservation. The first known legislation in this territory can be dated back to as early as 1915 under the British administration. Turtle sanctuaries in Sabah and Terengganu have already had three decades of history. Malaysia is also a signatory of CITES, a Range country of CMS, and is a signatory of the Memorandum.

Siow and Moll (*op.cit*; 341) present the chronological review of the early stages of legislation. The first known legislations were the 'River Right Enactment' of Perak which prohibited the killing of estuarial turtles. Pahang also established a regulation at the same time. In the Pahang State Enactment No. 3 (the turtles' eggs enactment), the Resident (Chief Administration Officer of the State) was given power to control the collection of turtle eggs. Subsequently, the entire Pahang beach was controlled, and egg collection required licences. Under the State of Pahang Fishing Rules 1938, turtles were first classified as fish and it enforced that 'no person shall capture, kill, injure, sell, or have in his possession any turtle unless authorized, and no person shall in any way prevent or hinder turtles from laying their eggs'. Similar legislation was promulgated in the State of Kelantan in 1932 under its 'Turtles and Turtles' Eggs Enactment'. In 1935, Enactment No. 8 amended the former rule to give firmer control. It is noteworthy that Terengganu, having the largest turtle population in Malaysia, waited until 1951 to prohibit the killing

of turtles, and to control the collection of turtle eggs.

Under the present legal framework, the management and conservation of sea turtles come under the state governments. Therefore, although federal laws exist for their protection, these laws will not come into force unless they are adopted by state legislature (Chan, *op.cit*; 126). Presently, Terengganu, Sabah and Sarawak have state law concerning sea turtles - the Turtles Enactment 1951(Amendment) 1987 of Terengganu, the National Parks Ordinance and the Fauna Conservation Ordinance of Sabah, and the Turtle Trust Ordinance (1957) and the Turtle Protection Rules in Sarawak.

Federal laws which relate to sea turtle conservation are the Marine Park laws and the Fishery Act. The former prohibits fishing operation within 5 nautical miles of Marine National Parks. The latter prohibits using drift-nets with mesh sizes exceeding 25.4cm.

From the view point of adequacy, there are two critical shortcomings in Malaysian legislation concerning sea turtles. Firstly, the laws do not prohibit the internal trade of turtles; their parts and their production while international trade of these items are restricted under CITES. Secondly, any state in Malaysia, including Terengganu, has not seized issuing licences for turtle egg collection (Ibrahim and Sharma, 2006). The existing legislation only gives full protection to the leatherback in Terengganu. Other species are unfortunately not included. As a result, egg harvesting continues as a legal business in the country.

2.2.3.3 Educational approach

Various organisations including state governments, the Department of Fishery, local universities, and WWF engage in environmental education. In Terengganu, the turtle information centre at Rantau Abang under the affiliation of the Fisheries Department of Terengganu plays a major role. Universiti Putra Malaysia (UPM) has also disseminated several kinds of brochures to local school kids and tourists. The University has also distributed leaflets to primary school students in Terengganu. In the urban areas such as in Kuala Lumpur, WWF displays posters in various places, highlighting the endangered status of sea turtles.

2.3 Turtles in Terengganu

This section introduces two turtle sanctuaries in the state of Terengganu. As shown in the previous section of this chapter, most of the sea turtle nesting areas in Peninsular Malaysia are located in Terengganu. In addition to that, Terengganu is one of only three places where the leatherback turtle nests in the Asia Pacific region. Therefore, these two sanctuaries naturally play leading roles in sea turtle conservation in the country. The first part of this section summarizes the status of sea turtles in the state. Then, conservation programmes in the two sanctuaries are briefly illustrated in the following part.

2.3.1 Current Status

There are mainly two species of turtles that nest in Terengganu. These are the leatherback turtles and the green turtles. Rantau Abang sanctuary aims to protect the former whereas Ma'daerah strives to save the latter.

Terengganu is the only place where the leatherback turtles nest in Malaysia. The state has even been considered as the only nesting place in the Asia-Pacific. Nesting of the leatherback turtle is not uniformly distributed along the entire coastline of the state. However, it is concentrated along a 15 km stretch of beach area or shoreline that extends from Kampung Jambu Bongkok to Kuala Abang with Rantau Abang being the centre of the nesting concentration²⁵. The annual number of nesting has gradually decreased since the 1950s. The nesting number in the early 1990s was less than 3 per cent of the 1950s (Chan, 1991; 8-28). The graphs in Figure 2.1 and Figure 2.2 show a steep decline in nesting numbers. This decline trend has accelerated since then and finally dropped to zero in 2007.

²⁵ Chan (Chan, 1993), however, pointed out shift of nesting concentration from Rantau Abang to adjoining area.

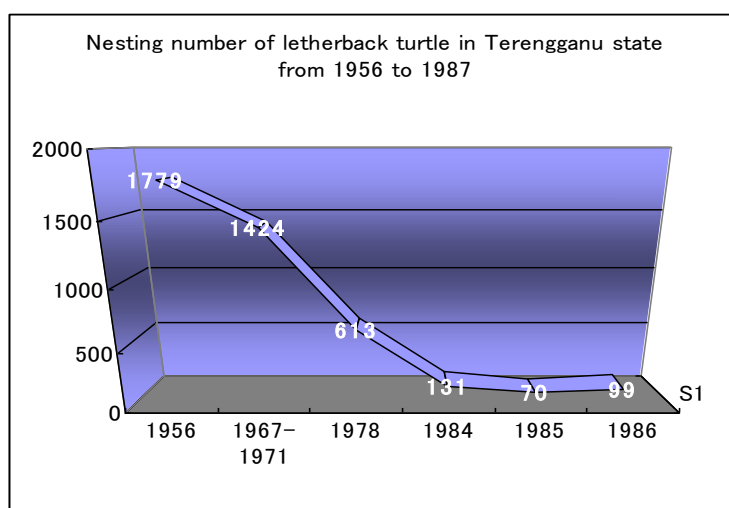


Figure 2.1: Nesting Number of Leatherback Turtle in Terengganu from 1956 to 1987

(Source: Department of Fisheries, Terengganu)

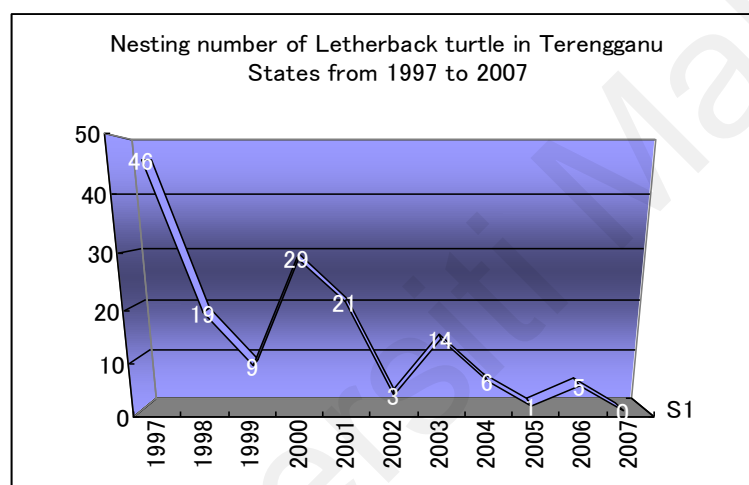


Figure 2.2: Nesting Number of Leatherback Turtles in Terengganu from 1997 to 2007

(Source: Department of Fisheries Terengganu)

In Terengganu, the green turtles nest particularly on Pulau Perhentian Besar, Pulau Redang, and on the southern part of its mainland, namely Paka-Kerteh and Geliga²⁶. The greatest nesting ground in the mainland is Gliga. The Paka-Kertih rookery which is

²⁶ In addition to this, there occurs the only significant nesting aggregation along the west coast in Perak. In East Malaysia, nesting are concentrated mostly on Sarawak Turtle Islands on Talang Talang kecil and Setang Besar and the Turtle Islands of Sabah (Pulau Gulisaan, Pulau Bakkungan Kecil and Pulau Selingaan). All these populations have registered declines, with current nestings representing only 12 to 40 per cent of the nestings recorded in the 1940s and 1950s.

composed of Paka Syarikat, Rhu Kudung, Tanjung Batu, Cagar hutan and Madaerah, is the second largest rookery. Both rookeries are located in the Kemaman district of South Terengganu. Terengganu still accounts for around 90 per cent of turtle nesting in Peninsular Malaysia; however, nesting numbers are declining as shown in the graph in Figure 2.3.

To assess the status of the green turtles in the state, land development is an especially notable factor. The northern islands have witnessed rapid tourism developments since the late 1990s. Islands which were once visited only by campers and a small number of backpackers are now concentrated with luxury resorts as a result of recent tourism promotion of the country.

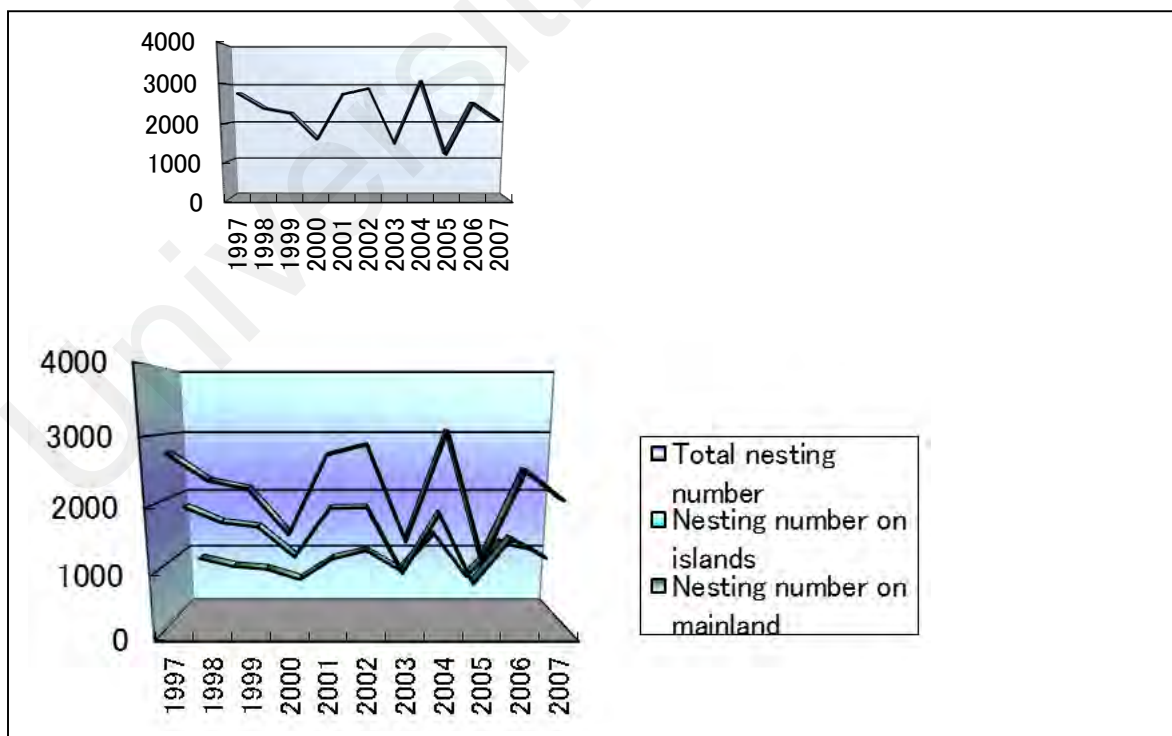


Figure 2.3: Nesting Number of Green Turtle in Terengganu State from 1997 to 2007.

(Source: Department of Fisheries Terengganu)

In Terengganu, the northern and southern parts show a clear contrast in terms of economy - agriculture and fishery activities dominate in the northern area whilst heavy industry plays crucial role in the southern area. For instance, over 75 per cent of 1595.5 ha of industrial area within the state was located in the south as of 1997 (Unit Perancangan Ekonomi Negeri Terengganu, 2001; 14), and the concentration remains unchanged even today. This accounts for a higher standard of living and a greater degree of urbanization in the south. Meanwhile, the southern section of the mainland was turned into an industrial zone known as the Southern Terengganu petrochemical corridor in 1980s. A fact to note is that the two important rookeries in the Mainland Terengganu locate in the industrial zone, which serves as the stronghold of the national petroleum company, PETRONAS, and has attracted a massive amount of investment.

Before the advent of the petroleum industry in 1973, Southern Terengganu was merely a frontier. One factor that triggered the development of Southern Terengganu was the construction of Road No.3 running parallel to the shoreline in the 1950s. Land clearance of jungles commenced and roads were constructed, to eventually develop in terms of agricultural activities. This resulted in the development of the logging industry. The scale of land clearance activities was enormously expanded when the federal government launched a 443,876 ha rural development project named Ketengah on 12th April 1973 under the parliament act 104/73 (Lembaga Kemajuan Terengganu Tengah *et*

al. n.d.; 5. Unit Perancangan Ekonomi Negeri Terengganu, 2005). Under the Ketengah scheme, the federal government conducted large scale reclamation to provide new agricultural land interior parts as well as for the building of several new towns along the coastal areas. In consequence of the aforementioned development, the population in Southern Terengganu dramatically increased. At the same time, construction of roads provided businessmen in the fishery industry better access to the market. Siow (1987; 7) pointed out that the improved access greatly stimulated fishery activities by intensifying fishing efforts. Furthermore, construction, logging, and sawing labour workers migrated into the region during that period. Logging enabled several local businessmen to begin accumulation of capital.

In 1974, crude oil was found offshore. After this tremendous finding, the area began to experience greater change. ESSO Malaysia constructed a platform for off-shore mining and started operations in 1979. Eventually, the rustic region with a sporadic number of fishing villages was turned into a gigantic petrochemical industry complex which currently plays a principal role in the Malaysian economy.

2.3.2 Conservation measure- Turtle act

The Terengganu state established a state law to protect sea turtles named the Turtle Enactment (Enakmen Penyu) in 1951. The government further reinforced the enactment in 1987 to tackle the dramatic decrease in numbers of leatherback turtles.

This enactment strictly regulates the poaching of turtles. Police and rangers can arrest anybody poaching turtles or their eggs without a warrant (Section 4). It also strictly regulates turtle-based tourism. Any tourist found to kill, injure, or harass turtles shall be penalized (Section 12). The law further stipulates the establishment of sea turtle sanctuaries (Section 3-A). A sanctuary will be managed following the advice of the committee chaired by the state government as stated in the following excerpt:

Sesuat jawatankuasa yang ditubuhkan di bawa seksyen ini hendaklah bertanggungjawab bagi perlindungan, pemuliharaan, penggunaan, penjajaan, pengawalan, pengurusan dan kemajuan santuari yang baginya ia ditubuhkan dan, dalam melaksanakan tanggungjawabnya di bawah Ekman ini. Jawatankuasa itu hendaklah bertindak mengikut arahan-arahan yang dikeluarkan oleh Majlis penasihat santuari penyu dari semasa ke semasa. (Terengganu State Enakmen Penyu, Section 3-c)

To date, the government has designated Rantau Abang and Ma'derah as sea turtle sanctuaries. The former is a sanctuary for leatherback turtles and the latter is for green turtles. In practice, all eggs laid at these two places go directly to hatcheries. The beaches are off-limit at night during the nesting season. These regulations strongly promote sea turtle conservation.

On the other hand, a point to be emphasised here is that the enactment endorses turtle egg collection. The enactment stipulates that turtle eggs shall be collected with a license issued by the Sultan of the state. The state government executes bidding to decide

on a tender of a beach:

Suatu lesen untuk mengambil telur penyu daripada sesuatu kawasan yang ditetapkan boleh dikeluarkan oleh pegawai pelesen dan hendaklah tertakluk kepada syarat syarat yang ditetapkan olehnya. Sesuatu lesen itu hendaklah berjalan atau tahun sebagaimana yang tercatat di dalam lesen itu dan hendaklah dibayar mengikut kadar bayaran yang ditetapkan ke semasa (Terengganu State Enakmen Penyu, Section 9).

Yang Maha Mulia Raja dalam mesyuarat boleh dari satu masa ke satu masa mengeluarkan tendar-tendar atau dengan jalan yang sebagainya yang difikirkan patut untuk memberi kuasa penuh bagi mengambil telur-telur penyu di dalam mana-mana kawasan atau kawasan kawasan. Kuasa penuh yang sebegitu tertakluk kepada syarat syarat yang ditetapkan oleh yang Maha Mulia Raja dalam mesyuarat (Terengganu State Enakmen Penyu Section 10).

One must note that any campaign calling for a halt to turtle egg collection has no legal grounds in the State. This fact greatly undermines the position of conservationists whom are against egg consumption.

2.4 Discussion

This chapter briefly reviews the present status of sea turtles, their main threats, and existing conservation attempts. As already depicted, the species are severely endangered worldwide. Malaysia is not an exception as the population in the country is under serious threat too. It is unfortunate that the leatherback turtle in the country is almost extinct

despite decades of efforts to save them. The threats and mitigation measures can be summarized in Figure 2.4 on the next page.

The figure is drawn based on a discussion conducted by Liew (2006). Hazards for sea turtles have various components, of which they can be roughly divided into two components - natural hazards and anthropogenic hazards. Human hazards are divided into four - hazards from land development, industries, improper conservation, and coastal communities. Legal measures can mitigate most hazards except for those coming from improper conservation, given that the regulations are successfully enforced. An educational approach is effective to reduce the impact of hazards caused by tourism or inhabitants of coastal communities, although it would not mitigate any loss of habitat. A socio-economic approach is only applicable with hazards stemming from coastal communities. It is also likely that compensation is given to the coastal community who then relinquish a nesting beach for economic purposes.

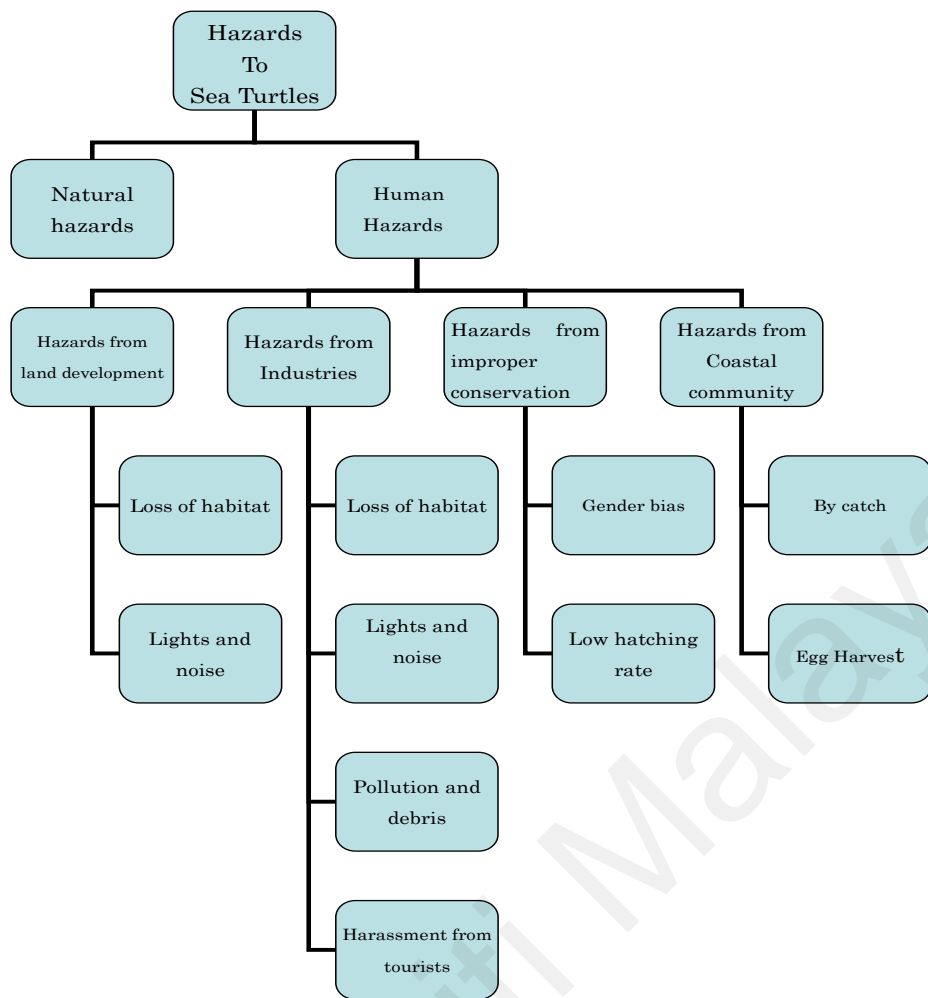


Figure 2.4: Threats to Sea Turtles

(Source: Drawn by the Author based on Liew (2006))

Malaysia has a long history of sea turtle conservation. The country has run hatcheries and sanctuaries for over four decades. It also has regulations to protect sea turtles implemented five decades ago. In addition, various groups have engaged in educational methods to raise public awareness. However, the performance of hatcheries has remained low until only recently. The regulation had also condoned trading activities of turtle eggs of various species. The internal trade of turtle products has not been

regulated either. Furthermore, little action has been taken to protect the habitats of green turtles, the hawksbill, and the Olive ridley turtles. This is in line with socio-economic approaches which have hardly been practiced in the country. Admittedly, the performance of past conservation efforts in the country has not been high enough which lead to the failure in the country to save the leatherback from extinction.

The following chapters of this study will discuss two points. First, consensus making amongst stake holders will be dealt with. Basically, existing conservation measures are chosen as a result of a debate amongst various interests. For instance, conservation biologists (e.g. Chan, 1993; *op.cit*, Motmier, *op.cit*, Siow and Moll, *op.cit*.) are often pointing out incompleteness of present regulations, and make recommendations for their reinforcement. However, the decision whether the government accepts their recommendations rests on comparisons with the interests of other parties. A simple fact to note is that conservationists merely comprise of one stake holder with a relatively small say. Surprisingly, this viewpoint is not included in Malaysian sea turtle conservation and no literature has ever argued about the politics of sea turtle conservation. Chapter 5 of this study intends to fill this vacuum. The second point to be discussed in the following chapters is the examination of whether a local community can accept a sea turtle conservation project. A conservation project may be violently rejected or ignored if it fails to garner the interest of the local community. On the contrary, a project may gain support

from the local community if it successfully matches their potential needs. Additionally, the local community may interpret the objective of a project in their own way which can differ greatly from the original mandates of the projects, hampering its smooth implementation. Chapter 6 will attempt to identify factors that can accelerate or hinder the cooperation of the local community. Holding on to these motifs, the next chapter will review the theory of conservation. Special emphasis will be put on community-based conservation.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

This chapter aims to present several important concepts concerning conservation. Special emphasis is put on the concepts of co-management and community-based conservation, which are the key terms of this entire study. The role of this chapter is to channel the discussions in the previous chapter to a bigger context regarding conservation studies and to provide a theoretical foundation to Chapter 5 and Chapter 6. In the first section, two philosophical viewpoints in conservation; the utilitarian and preservationist viewpoints are explored. The next section argues on economic and political issues pertaining to conservation. The key terms used in this section are ‘opportunity cost’ and ‘external diseconomy’. In the third section, concepts of co-management and community-based conservation are examined. These approaches emerged to reduce hostility towards conservation by involving people in management and sharing the conservation debate on main stream arenas. This section introduces theoretical and institutional backgrounds as well as depicts different philosophies behind the two approaches. The fourth section discusses several key issues regarding co-management and community-based conservation. The issues deliberated here are conflict resolution, interests of the local community, strategic behaviours of the local community, and participation. The fifth section reviews previous studies on Malaysian sea turtle

conservation. Its focus is on how local intellectuals have considered the role of the community in sea turtle conservation. The final section summarises all the arguments in the chapter and clarifies the agenda of the study for the issues discussed.

3.2 Concept of conservation

This section aims to explain the concept of conservation. Although the usages of the word and their practices vary, they can for the most part be broken down into two approaches - the utilitarian and the preservationist. As these two concepts tend to underlie on various discussions regarding conservation, grasping their meanings will help us to discover the ethical foundations behind competing arguments of conservationists. The goal for a utilitarian approach is to harvest featured species to provide the desired products; whilst a preservationist management stresses on the protection and restoration of populations and habitats to maintain biodiversity (Weddell, 2002).

3.2.1 Utilitarian

The utilitarian approach plays a major role in discussions on ‘resource management’ as the idea regards wildlife as a resource that serves human beings. Early examples are from several reserves established in the colonial era where their aim was to increase the population of game species to serve for leisure activities of the Europeans²⁷. Another

²⁷ Early examples of such practices emerged as early as late eighteenth century. In 1769, the French government in Mauritius adopted a forest protection ordinance (Weddell, 2002; 52).

example is forest management in the United States in the early 20th century where its motivation was to maximize the production of the timber industry. The utilitarian viewpoint remains as one of the major topics of discussion related to wildlife even until today.

In the examples shown above, it is needless to say that the driving factor was not emotional compassion towards nature and wildlife, but the desire to increase the population of feature species that were highly profitable.

Another character of the utilitarian approach is manipulation of natural resources. Utilitarian managers practice various methods such as culling the population of a targeted species and hunting their predators. Their belief in the ability to control population size at will lies behind these actions. This approach implies that utilitarians are very optimistic in the abilities of modern disciplines such as forestry to optimise yield²⁸.

3.2.2 Preservationist

It is safe to say that the preservationist approach has a more sentimental character than the utilitarian approach. A preservationist claims to protect wildlife regardless their economic significance. The preservationist approach emerged in 1950s. The ethical basis adopted is the debate against the anthropocentric tradition of Western influences that regards nature as a resource to serve for human beings.

²⁸ Population dynamics models, such as logistic curve, have wide application to forestry, fishery, and wildlife management.

A radical example of the alternative to the occidental tradition is 'deep ecology' proposed by a Norwegian philosopher, Arne Naess. Naess proclaims the necessity of 'a deep-seated respect, or even veneration, for ways and forms of life' and the 'equal right to live and blossom' (Naess, 1973; 96-97). It is noteworthy that ideas from preservationists provide conservation practice discourses to appeal to the public, and that a radical preservationist has no room to compromise with a utilitarian. This is because for preservationists, the preservation of species must be guaranteed for its own sake as basic human right by birth under the modern legal system (Western and Wright, 1994; 2).

In practice, preservationists tend to claim strict registration upon human activities such as harvesting wild plants and animals, consuming products from wildlife, and construction activities. Their optimism that nature has great potential to adjust itself and to realize optimum equilibrium, justifies restraining human activities. However, more than a few preservationists have faced hostility because of this characteristic. Preservationists are regarded as 'bio-centrists' or 'environmental fundamentalists' who are extremely indifferent to the economic status of people living in protected areas or local traditions depending upon the consumption of the featured species (Ward, 1992; 22-26). Agarwal (Agarwal, 1992; 293-302) casts doubt on tiger conservation in India according to his statement, 'Tigers are obviously dangerous for the local villagers, while they are endangered species. Is conservation justified even when it can sacrifice safety of

people?’ A similar situation can be found in Africa. Whilst several carnivorous animals are under protection, the local community are very reluctant to agree with this practice (Western, 1994). Protection over African elephants has also resulted in the hostile behaviour of local inhabitants as elephants hamper for agricultural activities (Weddell, *op.cit*; 286-290).

3.2.3 Confrontation between Utilitarian and Preservationist

Having summarized the two major approaches, let us examine how their differences reflect statements on particular issues through two cases. The first case is confrontation between Japanese Fishery Agency and conservation NGOs pertaining to whaling activities. The second case is on the differing opinions regarding sea turtle egg collection. Interestingly, the second case shows how philosophies can differ even amongst conservation NGOs.

A typical claim of the utilitarian can be found on the website of the International whaling commission:

The purpose of the Convention is to provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry (<http://www.iwcoffice.org/commission>, 25th November 2006.).

The committee originally intended to regulate commercial whaling on a temporal basis in order to restore population size and thus, maintain the profitability of whaling. The whaling countries insisted on the re-opening of commercial whaling on the grounds of the commission's statement cited above. They have continuously claimed that the population of several species have recovered to be plenty enough to harvest - presenting the data of population.

On the other hand, the issue of population does not matter to the preservationist. The appeal presented on by an anti-whaling NGO, Whale Watch, is worth quoting as an example of the preservationist's view:

A Global Campaign Coalition that is absolutely opposed to the killing of whales, as whaling is inherently cruel and unnecessary. The coalition does not support the concept of the lethal sustainable use of whales (Whale watch, <http://www.whalewatch.org>, 26th November 2006).

The statement presented by the delegation of New Zealand to the International Whaling Commission also denies the utilitarian view point:

The size of the whale populations is irrelevant. My government's policy is that not a single whale should be killed; I ask the IWC to adopt measures in harmony with this policy (Cited in Nagasaki, 1994).

It clearly denies the idea that whales are considered a resource. Instead, what lies behind

this statement is deep compassion for the animal. In this sense, the death of even a single whale is considered unacceptable for them.

Despite the sharp contrasting differences, both the utilitarian and preservationist believe in the dualism between human and nature. In basic terms, they both hold the belief that nature keeps optimizing itself. Sequentially, they believe in the existence of equilibrium being realized automatically as long as managers successfully control human influence over it. The only difference between the two parties stems from their evaluation towards human influence. The utilitarian believes their ability in a manipulating nature, especially of the wildlife population. Their belief was that nature will meet its equilibrium and that humans are wise enough to grasp this mechanism. Consequently, they believe that nature can absorb the impacts of human exploitation as long as the exploitation is controlled wisely enough. It is their belief that the mechanism of optimization with mathematical models can be forecast, and the impact of the exploitation can be calculated rationally. On the contrary, starting from the belief on the existence of equilibrium, preservationists engaged tactics to minimize human impacts by implementing strict regulation on human activities - human impacts considered to be negative. For them, *laissez-faire* was the principal of management.

Detailed findings of human-geographers nonetheless challenged the dualism referred to that there is very little nature that is 'untouched' literarily and that nature is

always under interaction with human activities. They also challenged the naïve pessimism of the preservationist regarding human intervention of nature, presenting cases of successful resource managements by local inhabitants and the beneficial effect of local human activities on ecosystems.

3.3 Key issues in conservation

This subsection discusses economic and political questions pertaining to conservation. The main questions are as follows:

1. Do some groups unfairly bear more of the costs of protecting species and habitats than others?
2. Do the affected parties have the opportunity to give their opinion on the decision?

Question 1 is an economical question, whilst Question 2 can be categorized as a political question. The first subsection, which is on economic issues, will discuss Question 1, and the second subsection will discuss Question 2. The latter will also illustrate the reason that community-based management has started drawing attention.

3.3.1 Economic issues

Biodiversity conservation requires the restricted consumption or the decreased level of resource exploitation. In economic terms, this is the opportunity cost of conservation. Kumoyama (2004) points out that the Ibis conservation in China prevents local villagers from harvesting mushrooms and wild vegetables. She criticises that it hampers traditional food collection of the local community and eventually raised a hostile atmosphere towards the conservation program. Furthermore, the land allocated to the sanctuary may serve as an agricultural field or as a tourist facility. Owl conservation in the Northwest of the United States caused a series of litigations because the timber industry objected to the designation of the vast range of forest as a reserve for owls (Weddelle, *op cit.*; 282-283).

The issue Question 1 raises here is that the local inhabitants of the conservation sites face great opportunity cost because they are required to give up or are restricted from carrying out certain activities for their own subsistence or businesses, whilst parties who are more responsible to the decline of wildlife population or the degrading habitats tend to bear a cost that is too little.

‘External diseconomy’ is the economic term to explain this inequity. Barkley and Seckler (1972; 124-134) explain this term using a case of a river with a chemical factory and a fishing village as follows; the chemical firm is condoned to discard hazardous waste

into the river by the municipal government. Since the former started its operations, the population of fresh water fish had drastically declined. Fishermen had to visit another village to fish, and pay a significant amount of money to obtain the fishing license there. This case shows that the cost for remediation of the contamination activity, which should have been borne by the chemical firm, was not imposed on them. The damage to fishery resources was also not compensated. These costs can be termed as an external diseconomy of the factory's operation. Under this case, the adequate sanction to the firm and the proper compensation to fishermen are needed.

Another problem to note is the regressivity of the opportunity cost. Nakaya (2004; 90) pointed out this problem from his study on Tongan marine parks as follows; the parks required a restriction on small-scale coastal fishery. The fishery had been most beneficial for landless households because fishery rights had opened for any Tongan. The landless could not buffer the cost of conservation whilst the landholders could absorb it by intensifying farming.

Another factor that entails regressive effect of the cost is that wildlife reserves tend to be located on relatively impoverished sites. One simple reason for this is that wildlife prefer less developed areas, and the reason for this being political is that the areas which are barren and unsuitable for agriculture and industry tend to be designated as reserves.

In terms of the distribution of cost, conservation benefits tend to serve those who

live far away from the site the most²⁹. For instance, the direct benefits of conservation of wildlife in Third World countries go to the westerners who enjoy watching the animals, or those who invest in the tourism industry. McNeely (1992; 18-19) points out that the over-exploitation of wild animals and plants benefits consumers because it lowers down prices of goods. McNeely claims that it is necessary to redistribute the consumer surplus to the cost bearer, which consists primarily of the local inhabitants. Without such redistribution, the lower price would stimulate consumption and consequentially lead to continuous over-harvesting.

Conservation in a developing country has several common difficulties - conservation in India epitomizes such difficulties with Ward (1992) describing them. Firstly, despite the well-organized structure of plans, the lack of efficient enforcement makes them meaningless. This is due to the low priority and insufficient budget allocated for conservation (*Ibid*; 8-19). Secondly, anthropogenic factors endanger wildlife mainly and these threats intensify in tandem with the rapid population growth (*Ibid*; 10, 18). Thirdly, local inhabitants are hostile towards conservation efforts because of costs stemming from its practice (*Ibid*; 22-26). The consensus-making process between conservationists and other parties tends to increase in difficulty under severe economic conditions because the restrictions over local resources could result in starvation.

²⁹ One should note that the economic term 'benefit' originates from Benthamian utilitarianism. Following the terminology of the British intellectual tradition, benefits in economic term do not necessarily refer to money. It simply refers to one's contents.

Therefore, conservancies need to pay serious consideration to prevent from restricting resources to the local community, if the community is suffering from rampant poverty. Documents regarding sea turtle conservation in Africa (Siakor et al, 2000, Muir, 2004, Okemwa *et al*, 2004, Bal *et al*, 2007, Dossa *et al*, 2007) commonly highlight that poverty amongst the fishery community is the reason for the illegal capture of sea turtles and the over-exploitation of other marine species.

The sustained conservation of local resources simply requires that the local stake in conservation becomes somewhat greater than in the previous resource use patterns deemed unfavourable to conservation efforts (Bromley, 1994; 429). Opportunity cost is a central term to analyse conservation issues, as discussed earlier.

Benefits to motivate people may include increased accessibility or control of resources, or elimination of risk. It is also wrong to state that people are only motivated by short-sighted profits. Tropical forests are well-managed by native people who have a long-term perspective to gain from harvesting fruits, honey, and medicinal herbs; and in contrast, these forests are severely damaged from logging activities conducted by itinerant workers motivated only by short-time profits. From here a difficult issue is brought up regarding the rights and duties concerning who is excluded from use of biological resources. The method of exclusion would have to be defined, monitored, and enforced in some way. These issues seem to relate with a national level legal arrangement and

enforcement than via community level sanctions and monitoring. Needless to say, it is also true that long-term incentives are greatly influenced by national policies and legal structures on which communities have no power of influence. These facts warn against community-based management which may have expectations that are too optimistic.

3.3.2. Political issues

Solving the issue of how to prevent, solve, or at least mitigate conflict is a major challenge to conservation. The prolonged conflict in the Island of Zalynthos, Greece, showcases how difficult this task is. Let us review the most well-known conflict regarding sea turtle conservation through the documented work of Greek researchers (Dimopoulos, 2001, Venizelous and Corbett, 2005):

Lagnas Bay, in the island, had been a touristic place long before turtle conservation launched. When conservationists became aware of the extent of turtle nesting, holiday accommodation and facilities had been already been built on the land behind the beaches. The beaches had turned into a hot spot when their ecological importance was revealed in 1990. Even though the state partially owned the land on the beach, and designated them as public property (Mission Report by Inspector of Public Property in the area ref. 252/23-9-66), illegal development of the land still continued.

The first environmental NGOs started acting in 1983. Their intense lobbying

triggered the suspension of visits to the nesting beaches and a German tour operator finally threatened a total boycott of the area without proper environmental protection. After a decade of tension between tourism developers and conservancies, the former purchased land for the construction of a 3,000 bed tourist village above an important nesting beach in 1993. As a counter action, the NGOs started lobbying for the creation of a National Marine Park. Tension between two stake holders culminated when WWF purchased land in the disputed beach. In 1995, landowners opened an illegal road bypassing the WWF property, and several NGOs took legal action. This ignited a violent resistance with a bomb attack at the headquarters of the Zakynthos Ecological Movement in 1995 as well as rampant arson incidents since then.

After such a severe struggle, the government refurbished the legal structure for the conservation of the bay with a series of Presidential Decrees and regulations. In 1995, the Ministry of Environment promised that the demolition of illegal buildings would be carried out (Council of Europe Secretariat, 1995). This promise, however, was hardly implemented due to the resentment of the local population. The great political cost of persecution resulted in impasse of the situation.

What broke through this impasse was pressure from the European Commission. In 1998, the European Commission commenced infringement procedures against the Greek government, and the European Structural Funds cancelled the construction of a sewage

system in the protected area. In 2002, the European Court of Justice found that Greece had failed to fulfil its obligations. This resulted in a Presidential Decree declaring the creation of the Zakynthos National Marine Park.

The case above illustrates the vital importance of consensus-building amongst stakeholders. It will not be successful without a local consensus. In this case, conservationists chose to prioritize their appeal towards the public opinion abroad and parties in the higher political hierarchy. As a result, even though they greatly succeeded in imposing political pressure from outsiders, their success only intensified the local struggle. As Agrawal (*op cit*; 297) pointed out, conservation can trigger ‘the hostility and resentment of people who feel that they were not consulted in decisions about resource use can undermine conservation’ and symbolized an ‘anti-people government which wants to throw the poor out and open up nature’s bounties to middle and upper class tourists’ amongst the local community.

The consensus-building requires a good relationship between the conservationists and other parties, requiring active sharing of information amongst the parties. However, this method did not necessarily go along with the attitude of conservationists until recently. Campbell (2007; 318) summarises the common discourse underlying the traditional approach of conservation as follows:

The traditional narratives describes wildlife populations as threatened directly with extinction by local harvesting and indirectly by habitat degradation and fragmentation. Local people are identified as the problem, and the solution is to remove wildlife to protected areas, where it is not subject to exploitation or competition. This protection is enforced by the state, and if local people continue to hunt or harvest they are labelled poachers and thereby reconfirm beliefs about the source of the problem. As they are breaking the law, the solution becomes more and better enforcement.

The assassination of Dian Fossey, a leader of Rwandan mountain gorilla conservation project, epitomises tragedy stemming from such mind-sets. Weddell (*op cit*; 375-377) reports the case as follows:

Rwandan mountain gorilla attracted the Westerners very much. One of the best-known from them is Dian Fossey. Her attitude towards the Rwandans was truly hostile. Dian never delegated any responsibility for conducting scientific studies to them, and she also attempted to keep local villagers away from these gorillas with the worry that if gorillas became accustomed to dark skinned people they may be caught by poachers more easily. Her prohibition to enter the habitat of gorillas kept villagers from beekeeping, firewood collecting, and farming activities. Furthermore, her methods against poaching were very aggressive; she cut traps, intimidated poachers and their families, and campaigned for stiff penalties, and this eventually lead to her assassination. She was a typical western conservationist during her generation. This attitude included indifference

and a lack of sympathy towards the local community. Apart from that, the Rwandans were not given information about the animal at the time. All the films, books, and articles published went to Western scientists. When Vedder and Weber (1990; 83-90) visited Rwanda, they found that 'No Rwanda scientist had ever seen, let alone studied gorillas, no university student had been trained to fill this void, no references were made to the gorilla or its habitat in primary or secondary school curricula, and no effort had been made in the broad area of public education'. It was natural that Rwandans had little interest in conserving gorillas³⁰.

This deplorable case strongly evokes in us the following questions: How can conservation projects mitigate the hostility of the local community, and how can the projects be deemed acceptable for them? As a strategy to address these questions, community-based conservation, which respects the local community and considers them to hold a vital role in conservation, started drawing.

3.4 Co-management and Community-based conservation

Having reviewed fundamental concepts of conservation and its key issues, our argument is narrowed down to focus on co-management and community-based conservation. The section will scrutinise the conceptual and instructional frameworks of

³⁰ Similar cases are reported concerning documentation of Intangible Cultural Heritage. Even though lots of Audio-Visual documentation of traditional performances and oral-traditions were done in developing nations by the Westerners, few of them have been available by bearers themselves. In view of the disappointing current status, community-led documentation is promoted by institutions such as Vietnamese Ethnic Museum and International Research Centre for Intangible Cultural Heritage.

these approaches.

As discussed before, conservation is getting more tolerant towards human activities in wildlife reserves. It was previously discussed that conservationists used to regard people in protected areas as a disturbance to their missions (Yoneda, 2005; 24)³¹. Utilitarians despised local inhabitants because they were a cause of uncertainty that spoiled their management efficiency. Preservationists hated the existence of people in a protected area because they had an idealistic viewpoint that nature is precious whilst human activities were considered ‘ugly and evil’. This resulted in a ‘fence and fine’ approach to prevent people from entering the protected area. This approach has entailed a great number of serious conflicts with local inhabitants as reviewed.

As such, this has led to the urge for a paradigm shift in conservation methods. A central concern of conservationists today is in determining how to involve the local community in the management of protected areas. Managers even expect positive roles to be held by the local community in terms of conservation, as recent discussions on sustainability respect local inhabitants as good custodians of the environment. Here, the co-management and community-based conservation approaches, emerge.

3.4.1 Conceptual framework

Firstly, an overview concept of the two terms, ‘co-management’ and ‘community-

³¹ For instance, IUCN professed that exclusion of inhabitants is a requirement to establish a national park (Yoneda, 2005; 24)

based management' shall be provided here. These ideas both emphasise the positive effect of local inhabitants in conservation and both strongly encourage the participation of the local community in the decision-making and monitoring processes. In terms of actual implementation of programmes, the boundary between co-management and community-based conservation is not clear although these ideas differ greatly in their philosophical basis.

According to Murfree (1994; 410), a community refers to a social unit with members who interact directly and have a collective identity which are both self-defined and other-defined. The term 'community' here assumes a primary relationship. It is deemed to have group norms, which are upheld mainly through peer pressure amongst the members. These criteria require a certain limitation in terms of membership and spatial extent. Thus, communities usually have a spatial dimension, and the terms 'community-level' and 'local-level' are used interchangeably.

Co-management primarily aims to increase management efficiency from the viewpoint of managers which includes government officers. To achieve this purpose, a consensus amongst stake holders is sought through the establishment of a management board, or via judicial mediations. The board can include various parties such as governmental agencies, NGOs, aid donors, private companies, academic institutions, and local residents. This allows for various combinations in theory, yet it basically implies

that there will be a dominant role for a powerful agency such as the government and international institutions. Its merit can be explained in the following passage:

Basically, by instituting shared decision-making among these actors, co-operation than for opposition and/or competition, a game in which the actors can learn to optimize their mutual good and plan to cooperatively with long-term horizons (Pinkerton, 1989: 5)³².

This merit can be also explained using an economic term, transaction cost³³. Analysing the management of fishery, Rettig, Berkes and Pinkerton (1989) pointed out that fishery law enforcement was costly for both the regulating parties and the regulated parties when two sides have a mutual distrust. The regulators must devote greater efforts to seize the violators, if the regulated parties show little respect for the regulation. Besides that, the cost to draft a regulation will increase if the regulated side does not cooperate to collect the necessary data such as stock size. On the regulated side, they are urged to modify their fishing strategy once regulation is put into force. The adoption of new regulations requires cost to obtain the information. It sometimes even requires the investment for new fishing gears. Both sides can decrease such costs if they an information exchange can be done well in advance in order to seek a possible compromise during the early stages of planning. In short, co-management, which includes a dialogue between the two sides, can reduce

³² For further detail in game theoretical terms, see literatures in elementally game theory such as Axelrod (Axelrod, 1984).

³³ In this context, the word 'cost' does not simply refers money incurred. It rather denotes any input of time, labour, and physical resources. The word 'cost' in the context follows terminology in micro economics literatures especially economics of information.

transaction costs of the regulation.

Co-management has been promoted in the field of fishery resource management since the late 1990s³⁴. Although the fishery management has a strong biological/positivistic tradition and prefer a high level of government intervention (Berkes, 2003; 5-19), the importance of co-management has become more emphasized (Yamao, 1997a, 1997b, Grafton, 2005, Silver and Campbell, 2005). Townsend describes potential role of the community as follows:

Firstly, fishers' indigenous knowledge of coastal fishery resources is of great use in the enforcement of conservation measures being suited to local conditions. Secondly, their participation and cooperation in a sustainable management regime is cost-effective rather than the traditional from the top-down approach. Thirdly, local communities and people may be to administer regulatory institutions that are superior to externally-imposed regulations (Townsend, 1995 cited in Yamao, 1996; 3).

Facing difficulty in enforcement due to the lack of sufficient budget and others, managers inflate expectations of communities as a vehicle of better management. Using the social capital theory, Grafton (2005) explores the function of a community in management as follows:

³⁴ This currently mirrors the general trend in development study, which has increasingly encouraged participational approaches. Technocrat's central planning, which had been considered as rational, has greatly lost its legitimacy not just in specific sectors but in general since the collapse of Communist regime. For instance, small-scale village based irrigation has drawn attention as an alternative of central-planned dam-construction (Little, 1994; 352).

1. Trust among fishers reduces costs of monitoring the actions of individual.

Compliance of rules is deemed too high due to general reciprocity principle among community members.

2. Trust between fishers and the management authority also reduces regulatory costs and improves management outcome; if fishers and the regulator trust each other, and have good working relationships, this promotes the sharing of knowledge and information about the resource.

3. Co-operation in fisheries contributes to an enhanced ability to help resolve conflicts, pooling and sharing of information, and devolution of responsibilities between the regulator and fishers.

4. Linkage across similar groups provides a mechanism for the diffusion of knowledge and innovation. It also enhances regional co-operation across fishing communities and helps conflict resolution.

5. Connections with groups at different hierarchies, for instance, connections between a fishery regulator and a group of fishers ameliorate

communication between fishers and regulators.

In view of these debates, a guideline of community involvement published by IUCN (1998) recommends making full use of existing social groups and building an alliance with the leader of those groups. Such leadership is allegedly embedded in the local social structure and legitimate in the local context.

A point to be taken here is that co-management based on the existing social structure condones the existing inequity on the local level. The management practice in this case relies on the alliances with the village level elite, and customary leaders. The management can be more efficient if local leaders are given more enforcement power. At the same time, such local powers are rooted in the existing distribution of power and would be amongst social grouping such as classes, generation, genders, households, and kin groups (Sato, 1995; 8-16, 26-28, Tsuji, 2002). Here exists a dilemma between efficacy and equity. High expectations for strong monitoring practices and enforcement tend to allow for this shortcoming. If one is not a reformist at least, one should be aware of the existing distribution of power in a community so as to evaluate potential negative impacts of a wildlife management project on a community such as the marginalization of a specific group coming from restrictions on resource harvesting.

Community-based conservation on the other hand, envisions making a change in

local political and social structures. The idea is incorporated with the promotion of a grass-roots style democracy and the empowerment of females. The following passages reveal ideas underlining community-based management clearly:

In community-based conservation, the emphasis has moved from the top to the bottom, from the centre to the periphery, from the elite to the poor, and from the urban to the rural. The shift has opened the door on the biggest conservation challenge of all:

(Snap)

Community-based conservation reverses top-down, centre-driven conservation by focusing on the people who bear the cost of conservation. In the broader sense, then, community-based conservation includes natural resources or biodiversity protection by, for, and with the local community (Western and Wright, 1994: 7).

As cited, Western and Wright do not consider the community as merely a vehicle for improving management efficiency. They place emphasis on the value of decentralization in a radical manner. For them, to reform both the government administration and the local social structure is as significant as conservation of wildlife, if not more. Another optimistic debate is that community involvement can politically empower citizens. From cases of environmental dispute settlement in the United States of America, Crownfoot and Wondolleck (1990; 225-226) illustrate that citizens can develop new skills in areas such as negotiation, communication, active listening, group process, and coalition-building. Moreover, they point out that citizens can improve access to traditional decision-makers by having newly established credibility and familiarity of

the process. Participants often have an opportunity to demonstrate not only their competence, in their reasoning. This opens new lines of communication and paves a path for mutual cooperation³⁵.

In view of empowerment of the local community, community-based conservation encourages the managers to offer economic opportunities to the local community. Community vegetable gardens, handicraft shops, eco-tourism programmes, free kindergartens, and medical clinics for villagers are some examples of such opportunities. It is expected that these programmes can compensate for the opportunity costs of conservation borne by the local community and accordingly mitigate hostility against conservationists. Activities more directly related to wildlife conservation such as awareness-raising and data-collection are combined with these economic support systems. Such programmes are reported in Africa (Muir, 2004, Okemwa *et al.*, 2004, Dossa *et al.*, 2007), Brazil (Marcovaldi *et al.*, 1998, Moreire, 2001, Marcovaldi *et al.*, 2007, Marcovaldi and Chaloupka, 2007), Costa Rica (Govan, 1998), Mexico (Wallace, Keistin and Salvador, 2000), India (Shanker, 2001), and Thailand (Stuart and Cartin, 1994).

The idealism shown under this method of conservation is a clear contrast to the conservativeness of co-management in several ways. Co-management does not always

³⁵ Another important reference of this intellectual shift is idea of capability proposed by Amartya Sen. Capability approach values redistribution of political resource such as says. The concept invited development economists to idealistic political debates Advocacy to enlarged political resource, such as say and accessibility to information, of the weak augments its legitimacy. As a result, International financial institutions come to stress political decentralization as well as economic liberalization in these 15 years.

care for the social structure of communities. A community that has a traditional form of authority which allows distribution disparity may still be considered a vehicle for good governance; here, its authoritarianism may powerfully serve for monitoring over-exploitation by community members. In other words, this co-management framework holds a utilitarian vision towards the community unlike the idealism that community-based conservation tends to propose.

Up to here, the subsection has explored the concept of community-based conservation. Before proceeding our discussion on the institutional framework, limitation of community-based conservation should be argued. Mohan and Hickey (2004; 165) noted that the key weakness of the project-based work favoured by NGOs is its inability to challenge wider structure of marginalization. Borrini-Feyerabend and Tarnowski (2005; 70) presented similar vision: according to them, human communities and nature share a common constellation of powerful enemies including big businesses, global trade and investment, and sweeping and careless economic development. To tackle these problems is obviously beyond the reach of community-based projects. In this connection, Brown (2004; 256) criticised that community-based projects have been 'hijacked' by powerful financial elites and hardly pose questions to the structural causes of the problems. Further, Cornwall (2004; 79) claimed that grass roots sessions hardly entail democratic decisions. According to her, the core assumptions of the sessions - equality of voices of

all participants and rational deliberation toward genuine consensus- are too idealistic. In reality, discussions are often in hands of small numbers of the most articulate, politically adept persons (Hailey 2001; 94). These points are to be examined in Chapters 5 and 6.

3.4 2 Institutional Framework

Having introduced two concepts in the previous subsection, this subsection explores the institutional background of these relatively new ideas. The legitimacy of co-management and community-based management comes from an international convention and a series of recommendations from the international congress. Although the former has a greater significance because of the binding power over signatory countries, the latter also play a specific role as a code of conduct amongst conservationists.

In 1996, the Convention on Biodiversity concluded that it plays a prime role for the legitimacy of its binding power over signatory countries³⁶. During its fifth convention of the signatory countries held in 2000, the ‘eco-system approach’ which aimed to foster the integration of a sustainable use of biological resources and the fair distribution of the benefits was adopted. The approach presented twelve principles, and of them, three principles are of great significance in the context of this study. Principle 1 manifests that the usage of land, water resources, and biological resources is a matter of social choice,

³⁶ In the 1970s, the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) , Convention concerning the Protection of the World Cultural and Natural Heritage was concluded in 1971 and 1972 respectively. It is noteworthy that these conventions have the potential power to shift the approach toward conservation greatly.

and that all stake holders must be involved in the decisionmaking process. Principle 2 declares that management should be decentralized and should be conducted by a local unit which is as small as possible. Principle 4 proclaims that potential merits and demerits pertaining to resource management must be estimated from an economic viewpoint; the correction of market malfunctions, improvement of incentives for conservation, and the internalization of external costs and benefits are indispensable (Secretariat of the Convention on Biodiversity, 2004 cited in Yoneda, *op cit.*; 8-9).

A congress that has great influence in terms of conservation is the World Park Congress hosted by the IUCN World Commission on Protected Areas (hereinafter, abbreviated as IUCN-WCPA). Although holding congress events such as these is not legally compulsive under a treaty, they have been held once a decade since the first congress in Seattle was held in 1962. Recommendations of the congress serve as a de facto code of conduct of biological resource managers. Table 3.1 shows dates and venues of the congresses.

Table 3.1 Date and Venue of IUCN World Commission on Protected Areas

	Data	Venue
First Congress	1962	Seattle, The United States
Second Congress	1972	Yellow Stone, The United States
Third Congress	1982	Bali, Republic of Indonesia
Fourth Congress	1992	Caracas, Republic of Venezuela
Fifth Congress	2003	Durban, Republic of South Africa
Sixth Congress	2013	Sydney, Australia

Source) IUCN *ICUN World Commission on Protected Area- Steering Committee*

(http://www.iucn.org/about/work/programmes/gpap_home/gpap_wcpa/gpap_steeringcommittee/gpap_wcpascmeeting/ Accessed August 3, 2014)

Yoneda (*op cit.*; 18-25) summarizes the transition of the features of the commission in chronological order. During the first congress, little attention had been paid towards local inhabitants despite the debate on competition of land use with other sectors. Subsequently, the second congress focused on measures to manage visitors and avoid over-visits to reserved areas. The committee regarded the locals as a disturbance for management³⁷. However, this viewpoint of the committee has gradually changed since the third congress. During the third congress, the committee made a remark for the first time on the local involvement in planning and management. The importance of local knowledge was also mentioned. Further, conservation efforts in developing countries and the rights of indigenous people emerged as an issue for the first time during this third congress. Following this, the fourth congress was held immediately after the United

³⁷ During the second congress, it was noted that the Indian representative posed a question to establish a protected area for Asian lions in Gujaraat states of the country to ensure that there was no decrease in security of the inhabitant. It is an early remark on opportunity cost of conservation in an international congress.

Nations Environmental and Development (UNEP) Congress in Rio de Janeiro, and the importance of local involvement was continuously stressed upon. It is noteworthy that, during the fourth congress, the committee considered community-based management as an important principal in conservation policy. The fifth congress, which was held after the signing of the biodiversity treaty, emphasised several socio-economic matters. Firstly, the issue of three billion people living in poverty in developing countries was brought up. It noted that the increasing demand for food, fuel and water resources was the greatest threat to the environment. On the contrary, the committee stressed the importance of redistribution of benefits from protected areas to all parties including the local communities and indigenous people. In short, the committee has paid increasing attention to those who have been marginalized. This international norm legitimises community-based conservation programmes in Third World countries.

3.5 Key issues in co-management and community-based conservation

This section aims to deepen the insight on co-management and community-based conservation by examining the relevant key issues - the interests of the local community, the strategic behaviour of the local community, participation, and conflict resolution.

The first subsection queries the reasoning why a community-based conservation projects does not work as expected. Literature findings commonly advise that attention needs to be paid to the interests of the local community and local economy. These findings

however tend to fail to concretely describe the kind of interests that relevant stake holders actually have. A case study of the introduction of whale watching activities in Baha California Sur, Mexico will be introduced as one of the literatures that successfully described the concrete motivation of the local community to support the conservation of grey whales. The second subsection further includes an insight on the behaviour of the local community. The most important point here is that the local community can behave strategically to increase their interests and such behaviours contribute to the dynamics of a local society, with an example from Sasi in Indonesia. The third subsection will critically examine the relationship between conservationists and local inhabitants with regards to community-based conservation. A series of case studies on a community-based sea turtle conservation project in Costa Rica will highlight the fact that community-based conservation in practice could be far less friendly to the local community. The asymmetric distribution of power is the key term of this subsection. The fourth subsection will discuss the role of authorities in resolving major conflicts. A case involving salmon management in Washington State, the United States of America will be featured. The feature of this case is the successful commitment of the court. While promoters of community-based conservation expect an active role to be played in conflict resolution of community leaders, the final responsibility for conflict resolution still remains the responsibility of public authorities. This subsection explains the reasons why the intervention of public

authorities is needed.

3.5.1 Interests of the local community

Some literature findings (Yamao, *op cit.*, Hines, 2002, Nakaya, 2004, Metcalfe, 1994, Wongbusarakum, 2002) illustrate the insufficient performance of co-management projects.

Yamao (*op. cit.*) examines fishery resource co-management projects in Thailand. He attributes their dormant status to three problems - the conflict of plural objects to the projects, dependency on the government tends to hamper voluntary efforts, and the oligopoly of project benefits by particular members. Hines (Hines, *op cit.*) and Nakaya (*op cit.*) pointed out that the lack of social capital tends to paralyse projects. Hines (*op cit.*) studies dugong conservation in Thailand and she reconstructed the history of a conservation site from narratives provided by villagers and suggested that the lack of mutual trust between the government park officials and the local community during the early stages of conservation lead to prolonged negative effects. Nakaya (*op cit.*) conducted a field research in marine sanctuaries in Tonga and pointed out that the lack of adjustment of stakeholders' interest in administrative organisations and communities affected the project negatively. Wongbursarakum (2003) conducted a participational observation in the Adang archipelago, Thailand. She found that passive resistance was occurring by ignorant attitudes and the indifference of fishermen being displayed instead

of serious conflicts between government officers or members of NGOs.

The literature commonly highlights the importance of the adjusting interests of stakeholders. As Murphree (1994; 403) pointed out, such interests could greatly vary within a community because communities are not monolithic, undifferentiated entities. A community contains various categories of people distinguished by age, sex, interest, and power. For communities to act as effective agents of conservation, the internal differences must be accommodated to the collective goal (*Ibid.*). While the aforementioned literature commonly emphasise that a conservation project should reconcile with the interests of the local community, the driving factors that motivate people were not identified. Suganuma *et al.* (1999) claimed that sea turtle conservation in the Asian region must be debated with respect to the regional economy. However, this study is based on explorative fieldwork carried out only in Indonesia and Papua New Guiana, thus, the regional economy in his usage is seen as a general statement without specific diagnosis.

The case of the establishment of a whale sanctuary in Magdalena bay in Baja California Sur, Mexico, shows that small opportunity costs allow people to accept conservation. The bay is a well-known habitat of the grey whale and is one of the most well-known whale watching sites in the world today. Basically, the people have few rational reasons to oppose conservation efforts, or the management of whales. Dedina (2000) reports the following excerpt:

Magdalena Bay experienced intensive whale exploitation mainly by European whaling companies in the 19th century and early part of the 20th century. Due to the drastic decline of the whale population and competition with chemical substitutes, the European and American whaling industry collapsed. Losing the primary role for whaling, coastal communities in the bay were devastated until the whale watching business was launched. The Mexican government decided to designate the bay as a whale sanctuary and issued licenses as whale watching guides exclusively to local fishermen.

Although the fishermen were used to halibut and lobster fishing in the bay, whale watching became the more attractive option for them. First of all, it was more labour effective than the existing fishing activities. Whale watching did not entail the long navigation and laborious operations that were necessary for halibut fishing. Next, whale watching was considerably less risky for the fishing community. Working as a guide decreased the dependency on fish stocks. It also reduced the uncertainty of harvesting activities that fishery operations involved. Once the inhabitant regarded whale watching as an important business for the local economy, they have made sure to carefully protect whales. As a consequence, the population of whales in the bay recovered dramatically.

3.5.2 Strategic behaviour of local leaders

Co-management requires a consensus between the parties involved which include

governmental agencies, NGOs, and groups of local inhabitants. This is relatively easy to attain if the main parties shares a common goal; the proper management of a species population. For example, the federal government of the United States and the Alaskan Inuit people agreed on the co-management of the bowhead whale because the US government needed to obey the international regulation set under the IWC regime, whilst the Inuit community was required to continue its harvesting activities as it served as a cultural core for them (Freeman, 1989; 137-149).

The transition of Sasi practices in Maluku islands tells that when several powerful parties share a common goal, resources are managed under various arrangements. Sasi is a biological resource management system based on community customs in Indonesia, and is regarded positively as a social asset for conservation (Murai, 1998). The critical question pertaining to this issue are those who define the problem and those who share it. In most cases, conservation programmes are externally initiated and imposed whilst the local inhabitants are unfamiliar with the idea and tend to feel indifferent towards the issue. In these cases, the notion of conservation must be re-interpreted to incorporate local concerns and communicate the problem in meaningful local terms. From here, such a transition according to Zerner (1994; 80-109) is reviewed.

Sasi limits the harvest of biological resources in terms of territory, season, gear, and people. It involves several local community members who ensure that the custom is

enforced. Moreover, it features familiarity amongst its community members as a custom (*Ibid*; 106). It is newly interpreted and even strategically adopted for conservation purposes. The transition presents a case of the strategic use of existing social assets embedded in communities. *Sasi* had a transitional character even during the Dutch colonial era. *Sasi* had prohibited the harvest of economically valuable plants under local customs. Dutch rulers found this system useful in securing access to prized crop in remote villages and tried to superimpose on already existing indigenous practices. At the same time, rural customary leaders whose source of authority had been mainly ritual also realized that an alliance with the Dutch could enhance their authority. Through this collaboration, relevant customs were collected and codified in Dutch and Malay. The village level enforcement had been commissioned to customary leaders and was supported by the Dutch officials, who paid a subsidy to the enforcers. Under modern trade, commercial motivation reconfigures the practices of the system. Prior to the 1960s, few rules had regulated access to reef molluscs and *Trochus niloticus* (Figure 3.2). However, a commercial market for the shell as raw material for pigment and ornamental items bourgeoned in the 1960s. Village government officials found that *sasi* would be useful in controlling the harvest and profit-making activities from the shellfish. They encouraged traditional leaders to revise their customs and they managed to get the latter to support such directions. For example, a village government regulation in Hatta Islands entitled

the village government to 6 per cent of the total harvest of the mollusc, whilst prohibiting the free access of villagers.



Figure 3-2: Trochus Niloctus

Source: Coral shellfish

(http://www.kanpira.com/iriomote_museum/shell/coral_area.htm; 4th February 2007)

The latest change is the invention of “green *sasi*”. In Indonesia, awareness on environmental issues has emerged since the 1980s. This awareness affected the interpretation and practices of *Sasi* (*Ibid*; 100-105). At Haruku village in Central Maluku, customs pertaining to *Sasi* were codified by a village-level officer, who held personal ties with the Indonesia Department of Population and Environment, and had been influenced by contemporary ideas of conservation. As a result, *Sasi* became explicitly responsibility for conservation as several invented articles of custom began to stipulate. For example, a newly invented article forbids cutting down trees in river banks to prevent erosion. The grounds of this article are based on modern geologic knowledge rather than traditional rituals. The enforcement of the revised customs was executed by customary leaders within

a geographic boundary that had been rigidly fixed by governmental officials on a map using mathematical grids. The revised customs serve as a platform even for NGOs that share stakes in conservation, and even indigenous enforcers have become allies. Since the 1990s, the central government has also strategically re-interpreted the customs. The Department of Environment has an award called *Kalpataru*, to authorize good local environmental practices and encourage conservation. The department has awarded the *Kalpataru* to several Central Moluccan communities practicing *Sasi*. The award triggered a transformation of *Sasi* to please department officers. For instance, planning vegetation to be situated near key water sources, the building of fences, planting mangrove for coastal stability and water purification are newly practiced as part of *Sasi*. Village leaders send periodic reports to the department.

From the view point of a community-based management, the lesson to be drawn from this case is how dynamic local communities can be. Far from being an idealistic notion which claims that traditions in Third World countries have been kept unchanged since ancient times; customs are being continuously re-invented as a result of the strategic choices of the stake holders³⁸. This fact reiterates the importance of paying attention to the interests of relevant stake holders. In addition, *Sasi* reminds us on the matter of local leadership. As Novaczek and Harkes (1998) had criticised, one should note that *Sasi* has

³⁸ Such a static image of the Third World rural society partially attributes to structural anthropology represented by Claude Lévi-Strauss.

a conservative and undemocratic character due to its enforcement methods where autocratic power and the authority of the village leaders had been pledged, whilst at the same time being a famous example applauded as indigenous wisdom.

3.5.3 Participation

From the case study of sea turtle conservation in Costa Rica, Campbell (2007) poses profound criticism against decision-making pertaining to sea turtle conservation in the country. She claims that the existing strategy for sea turtle conservation is a narrative constructed by experts. Based on an interview with 42 scientists, NGO members, and government officers, Campbell illustrated that these experts rarely allow the local community to exercise their own rights. Although most of these experts admitted that local participation is necessary, they mostly do not agree to allow the same people to join the decision-making board³⁹.

In the mind-set of such experts, participation meant employing the people as conservation staff, educating them to develop a pro-conservation mindset, and collecting information from them (*Ibid*; 320-321). Campbell criticizes this as a concept that encompasses only a narrow sense of empowerment; as the local community are deprived

³⁹ This is a commonly observed situation in other fields of participation programmes. Cooke(2004; 45) pointed out that fundamental issues such as organisation purposes, reward structure, and resourcing are taken as non-negotiable givens in participational programmes. In the field of management, Taylor (2001; 133-134) severely criticised that Employee Involvement and Participation (EIP) is 'cometic' because production decisions and all quality targets are dictated either by management dictated either by management decreed goals or 'customer needs'. According to him, managers expect and enjoys the right to make ultimate desision on important matters, despite the rethoric of participation.

of management rights. Experts can decide whether they give harvesting rights to the local community. Although the Inter-American Convention for the Protection and Conservation of Sea Turtles stipulates certain rights for traditional subsistence, it does not provide the terms for “traditional” or “subsistence” specifically. The interpretation of the clause rests on each signatory government and will mirror the political intention of the countries. As far as Costa Rica is concerned, turtle egg harvesting is strictly restricted by the government and condemned by NGOs and scientists because it tarnishes the promotion of eco-tourism of the country.

Her criticism also includes the discourses regarding the special scale of conservation that are being constructed by experts. A similar argument is resonated from the literature findings of Brown and Purcell (2006; 607-624). Brown and Purcell argued that promoting conservation at any particular scale is not simply a matter of biological or ecological necessity, but serves for the political interests of a particular group. Thus, they suggested that posing “ontologically given” notions of space into conservation practices was naïveté. Bearing this debate in mind, Campbell describes that experts promote sea turtle conservation in Costa Rica using the global endangered status of the species. Considering that their population has increased in Caribbean countries, this promotion is dubious. The decrease in numbers is actually mostly attributed to the severe depletion in the Pacific region (*Ibid*; 324). From this vantage point, she also criticises that the Inter-

American Convention for the Protection and Conservation of Sea Turtles refers to the global endangered status as the grounds for the high restrictions over turtle and turtle egg harvesting.

Campbell and Smith (2006) further examined the mindsets of volunteers who participated in sea turtle conservation in Costa Rica. They found eight main values that motivated the volunteers; namely the conservation value, scientific value, aesthetic value, humanistic value, experiential value, existence value, instinct value, and spiritual value. What made their findings interesting is that none of those interviewed gave a utilitarian value of sea turtles such as for the provision of meat and eggs, or as an attraction for the tourism industry. This is a natural consequence of her sample. The parties interviewed are volunteers who pay certain amounts of money and come all the way from outside the protected area. Naturally, these respondents are concerned about ecological issues compared with ordinary people. Taking this as a point of reference, Campbell and Smith stated the following:

One of the motives for studying volunteer values was our interest in the potential conflicts of values that may arise among the various stakeholders. Although further research on values held by other stakeholders is required, the fact that volunteers target local people as the “problem” for sea turtle conservation suggests that the potential for such conflicts is real (Campbell and Smith , 2006).

They also found that very few volunteers linked the plight of sea turtles to a wider range of issues encompassing environmental quality, and instead focused on local consumption as the problem. Volunteers regard fishermen as a central problem and the main target of enlightenment. They presume that the awareness of the fishing community is much lower than that of volunteers themselves. However, there are some questions that have been left uncovered: Do fishermen have very different ideas from those of volunteers? If any, what are the concrete differences between them? What kinds of conservation practices will match the perception of the local community? These questions are what this study aims to reveal.

Silver and Campbell (2005) show a similar concern:

One way to more critically assess participation in fisheries management, enforcement, and research is to try to understand the experiences of the participants themselves. Such understanding will not only help assess a specific instance of participation according to Pretty's typology (or any of the others), it can also help improve participation as it is promoted and applied by managers and researchers, and as it is experienced by local fishers (Silver and Campbell, 2005).

Having this consciousness, they analyse the mentality of fishermen in the Costa Rican sea turtle conservation site. In Costa Rica, community involvement has a history of more than a decade in terms of turtle conservation. Managing officers held periodical sessions with fishermen in order to obtain information on turtle fishing and use, and to

capture valuable local knowledge/opinions on marine turtle issues, such as population health and size, historical trends in fishing, turtle population numbers, and management options. They discovered that several fishermen claimed that the existing co-management project was designed to justify the tighter regulations on turtle fishery and to catch those involved in illegal fishing activities. These fishermen are worried about how the data would be used. Furthermore, in the opinion of many fishermen, managers should spend more effort on species with more economic significance for them.

3.5.4 Conflict resolution

Successful conflict-resolution is one of the most crucial factors that helps to reduce transaction costs. Salmon management in Washington State of the United States as reported by Cohen (1989; 37-49) presents us with conditions for successful conflict resolution pertaining to co-management.

The adjudications of such cases affirmed the right of the tribes. Amongst them, U.S v. Washington in 1974 played a significant role in developing the co-management framework. The conclusion of the case recognized the tribal management responsibility, with the allocation of fifty percent of production from their common fishing places off the native reserves. The adjudication secured that “Tribal right is not limited as to species, origin, the purpose of use, or the time or manner of taking, except to the extent necessary

to achieve preservation of the resource (U.S. District Court, 1974; 413-19)". Under this regulation, conservation is the only restriction for the tribes. The judge ruled that the tribes had the authority to regulate their own off-reservation fisheries provided that they met certain preconditions that established their ability to manage the resource⁴⁰. This meant that the tribal community is allowed to autonomously regulate their resource exploitation practices. To facilitate this, the judge posed several major steps to make the system work. These include both crisis management, and the development of new conflict-resolution methods on a long-term basis. It is obvious that this clarification enabled co-management efforts to decrease transaction costs for the parties involved. The establishment of the Fisheries Advisory Board in 1975 enabled the parties to avoid a daily recourse to the court. The advisory board permitted disputes over management issues to be discussed in an informal and non-judicial setting. The board comprised three members - a representative of the affected tribe; the related state agency; and a technical advisor, in other words, a biological expert as the chairman. Either party could ask the chair person to hold a meeting. The chair person would recommend a solution only when the parties involved could not reach a negotiated agreement.

In the case above, the courts played this role well and its enforcement authority underpinned the co-management program. Little (1994; 362) states that "In areas where resource control is ambiguous and potential conflict exists; contracts can be innovative

⁴⁰ *Ibid.*

tools for ensuring that participating groups are rewarded for their contributions”. However, such formal arrangements and their enforcements are much less reliable in Third World countries. Moreover, there is a difference in accessibility to such formal procedure amongst areas, classes, and genders. Consequently, the project must rely on an alternative mechanism for dispute resolution. As discussed, this is a common justification for community-management.

However, such alternative method prove ineffective in halting encroachment and environmental degradation by outside groups and organizations. This comes from a fundamental problem which is that communities always lack enforcement or sanction authority when faced with parties from outside of their community. Whilst governments expect communities to operate field-level enforcement, they are reluctant to relinquish their power to them⁴¹. This prevents communities from functioning as powerful wardens against threats.

3.6 Sea turtle conservation study in Malaysia

Having examined concepts and key issues regarding conservation, the study reviews literature on sea turtle conservation in Malaysia. First, it covers the existing documentation works on sea turtles and conservation projects. Then, it sequentially scrutinises local arguments on co-management and community-based conservation.

⁴¹ *Ibid.*

3.6.1 Documentations on the current status

Literature on sea turtle conservation in Malaysia show a stark contrast between significant numbers of biological studies (Chan, 1989, 1991, 1996, Chan and Liew, 1990, 1996a, 1996b, Chan; Liew and Der, 1996, Liew, 2002, 2006, Motmiers, 1982, 1990, Salle, 1987, Tiwoli, 1997) and the complete lack of any in-depth socio-economic study. Amongst the biological studies covered, a series of studies conducted by Chan E. H. and Liew, H.C are worth noting. Terengganu-based marine biologists kept a population study of turtles nesting in the area. It is also considered a significant issue that they have constantly engaged in national conferences regarding sea turtle conservation. As a result, their studies consequentially serve as the bedrock of the conservation strategy in the country. Concerning social study, there are a few literature studies (Aikanathan, 1989, Nazri, 1998, Sharma and Lau, 2002, Ibrahim, 2002) that document the status quo of existing conservation projects. Most of the authors of these studies are the incumbent managers of projects, so these documents mainly introduce programmes that they are running or planning. In short, no full-fledged social science study has been available until now especially since the voice of the managed party is an ignored subject. The dynamics of consensus-building has never been documented and is thus left to this study.

3.6.2 Local debates on co-management

Currently, there are four important documents pertaining to the community and education presented on two sea turtle conservation conferences. These are the record of the 1987 workshop, a report of the WWF published in 1988 (Aikanathan and Kavanagh, 1988), the record of ASEAN program and work plan for sea turtle conservation held in 1997, the proceedings of the Workshop of Charting Multidisciplinary Research and Action Priorities towards the Conservation and Sustainable Management of Sea Turtles in the Pacific Ocean, held in 2004.

The necessity of education for the local community was recommended as early as 1987. The record of the discussion during the 1987 meeting made the following recommendations (Economic planning unit Terengganu and Department of Fisheries Malaysia, 1987; 22):

- a. Educate the coastal population to identify the different kinds of sea turtles and to aid the collection of information.
- b. Develop education programmes for school children via school curriculum, posters, and cartoon strips.

c. Highlight the plight of local sea turtles and the value of wildlife heritage.

d. Develop voluntary groups amongst the local public and conservationists to assist in education campaigns, beach clean- up programmes, and beach patrolling.

The point here is that education is meant to provide biological knowledge in view of mobilizing the local community and providing enlightenment to infuse in them, an affinity toward turtles. At that time, experts paid little attention to the interest of villagers. They also assumed that the local community had neither sufficient knowledge nor awareness in terms of natural heritage values. While they estimated the readiness of the local community pessimistically, they were optimistic in the information they would be provided with.

Aikanathan and Kavanagh mentioned the importance of a careful explanation of the conservation policy to the fishery community to avoid their resentment:

It is a well-known tenet of conservation work, that effectiveness can always be maximized with public-cooperation. Some of the above recommendations are designated to restrict the freedom of action of the state's fishing community in certain respects, which could cause some resentment if is not fully and promptly explained to the fishermen. In any case, there is no reason why the fishing community should be interested in helping the turtles if the whole matter is not explained properly.

It is recommended that the department of fisheries should launch a comprehensive public awareness campaign for the entire fishing community, focusing first of all on these sections of the community, which will be most affected by the bans and restrictions (Aikanathan and Kavanagh, 1988; 6).

Compared with the 1987 recommendations, the report was much more aware of opportunity costs that the conservation practices could entail.

“The ASEAN program and work plan for sea turtle conservation and protection” in 1997 also discussed education for the local community. The significance of the meeting was that it encouraged the local community to participate in the planning stages of the project. Furthermore, the conference also referred to the necessity to develop alternative avenues for income and cultural utilization, whilst the report of Aikanathan and Kavanagh only made the recommendation to persuade fishery communities to relinquish some of their subsistence.

Just three years after the first community-based conservation project launched in Ma'daerah, another large-scale conference called “the Workshop of Charting Multidisciplinary Research and Action Priorities towards the Conservation and Sustainable Management of Sea Turtle in the Pacific Ocean” was held. The idea of local participation, which had drawn an increasing amount of attention in past meetings, became one of the main agendas of this conference. Participants from Malaysia commonly promoted the Ma'daerah project as the pilot case study. Y.A.B. Datuk Seri Idris bin `Jusoh, the Chief ministry of Terengganu, remarked that “the work of

conservation does not lie principally with the animals, plants, and ecosystem but actually lies in dealing with humans” (Idris, 2004; 3). Following this, he stressed the importance of a “smart partnership with non-government bodies and private sectors must be enhanced in order to alleviate the mammoth task of conservation into a successful and fruitful affair” (*Ibid*; 5). In this regard, Ibrahim and Sharma also remarked as follows:

Emerging trends of government-public-private partnerships and the involvement of community groups increasingly provide an innovative approach for shared responsibility creating real impact for reaching out community in conservation measures (Ibrahim and Sharma, 2006; 11).

The roundtable discussion at the meeting also highlighted the importance of including the local community into management. Our key term, ‘community-based conservation’ emerged here. However, it should be noted that community-based conservation in this context was proposed in expectation of the labour force enforcement:

Public awareness is identified as essential. Integrated dialogue encourages them to establish a formal committee to be headed by state secretary. This committee should consist of relevant state and federal agencies as members, and also representatives from non-governmental agencies and community-based organizations.

(Snap)

Empowerment of local communities, like fishers and egg collectors, to manage and protect turtles and their eggs through a community-based management system could solve some of the enforcement problems (Department of Fishery et al, 2004; 32).

Up to here, this subsection subpart reviewed how the idea regarding community and education has changed. The significance of the discussion here is to prepare what “community-based” denotes in the particular context of sea turtle conservation of the country. A keynote for interpretation is the contrast between the idealism of the 1997 ASEAN meeting and the pragmatism of local documents. The former expressed the idea to involve the local community directly into the decision making process whilst the latter acceded the multi party partnership as Ibrahim presented in 2004. On the other hand, Malaysian documents are more inclined to expect mobilizing villagers up to recently. This is the inherited nature of the local debate since the 1987 workshop. The local debate briefly deals with compensation for opportunity cost of conservation.

3.7 Discussion

Up to here, the chapter reviewed the concept of conservation, core economic and political issues pertaining to conservation, conceptual and institutional frameworks of the new approaches, four key issues in co-management and community-based conservation, and previous studies on sea turtle conservation in Malaysia.

It first reviewed the two underlying philosophies for the debates on conservation. The study can be categorised as work of a preservationist as the author appreciates the intrinsic

value of wildlife, however, it pays utmost attention to life of local communities which can be affected by a conservation project.

Our debate proceeded accordingly into key issues within conservation. Conservationists have a tendency to be hostile towards local inhabitants. Project managers have been also indifferent with two crucially important points: Do some groups unfairly bear more costs in terms of protecting species and habitats compared to others? Do the affected parties have any opportunity to reflect their opinion on the decisions? The indifferent attitude has unfortunately triggered serious conflicts between conservancies and other stakeholders, especially with local inhabitants. As a consequence of such conflicts, the effective implementation of conservation programmes has been greatly hampered. The bitter experience of serious conflicts with other stakeholders has resulted in a paradigm shift in conservation.

Another point to note is that conservation is unfortunately not given a high enough priority in most of developing countries. Any argument pertaining to conservation should start with admitting that conservationists are very weak actors in real politics. A conundrum faced by conservation efforts is how the weak actor (the conservationists) can influence stronger stake holders to help realise their aspirations. It requires adjusting the interests of the relevant stake holders and sharing a common goal with them. The study views conservation as a politic in this sense.

Co-management and community-based conservation started drawing attention as effective approaches to mitigate the hostility of other stakeholders. These approaches regard the local community as the best vehicle for the effective implementation of projects.

Co-management seeks consensus amongst stake holders through establishing a management board or through judicial mediations. Theoretically, the significance of co-management is to reduce transaction costs through such measures. At a community level, co-management expects local leaders to mobilise people and to facilitate enforcement. Community-based conservation in particular associates with an idealistic aspiration for the empowerment of the weak and a grassroots democracy. Some community-based conservation projects even offer alternative sources of income as a compensation for the opportunity cost borne by the local community. These efforts contribute to override hostility of the local community against conservation.

Section 3.5 then discussed the four key issues of co-management and community-based conservation. Interests of the local community, strategic behaviour of local leaders, participation, and conflict resolution are the issues covered here. Having explored these issues, the study sets its direction to firstly, identify the interests of stakeholders, and this will be the central task of this study. This task includes determining a detailed description of the local economy and the background of decisions made by stake-holders. To identify the consistent motivation of stake-holders, an archive study will be conducted. Secondly,

the study shall focus on local fishermen. Written by officers managing the programmes or biologists partaking in the program, literature findings generally lack in efforts to mirror the voice of the local community. Even though some articles of literature (Yamao, *op. cit.*; 8-9, Wongbursarakum, 2003) observed the passive resistance of fishermen against community-based conservation, the factors that triggered such behaviour were rarely identified.

As Silver and Campbell (2005) pointed out, understanding the experiences of the participants themselves is a way to critically assess what participation in management or enforcement actually means. To understand what the fishermen experienced and how they felt, the study will conduct a systematic semi-structured interview, questionnaire survey, and Exploratory Factor Analysis. Philological factors behind the behaviours of fishermen will be identified from these processes. Thirdly, the study deals with the existing conservation strategy as a consequence of the strategic behaviour of relevant parties. It does not deal with the community as a homogenous, undifferentiated entity. Fourth, the study pays great attention to disputes and their resolution process. In other words, anthropological functionalism is not the main theme of this study.

The final section of the chapter reviewed literatures on Malaysian sea turtle conservation. The study is clearly the most systematic study on the socio-economic aspect of sea turtle conservation in the country and the first in-depth inquiry on physiological

factors behind the behaviour of fishermen. Until today, fishermen have been regarded as either a target of enlightenment or the source of a free labour force. The ways in which community members view conservation have not been seriously studied. Thus, this study tries to override this regretful tradition and pave a path to genuine partnership between the conservancies and the community.

Universiti Malaya

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

In this chapter, the methodology of the study is discussed. The main aims of this chapter are to disclose the operational procedures of data collection and analysis. This chapter bears importance to audit findings as represented in Chapters 5 and 6.

The first section discusses methodological limitations of the previous studies. The second section shows the basic research design of the study. The study comprises an interview of fishing communitythe fishing community in two villages, a key informant interview of conservation experts, an observation of a ranger's activity in the sanctuary, a document survey in the provincial capital, and a questionnaire survey in the villages studied. The third section discloses the method for data collection in detail. The fourth section explains the structure of the interview conducted at the studied site as well as the procedure for qualitative analysis. The last section introduces the questionnaire used for quantitative data collection and explains the statistical techniques applied for the quantitative analysis.

4.2 Statement of the problem

This section articulates methodological drawbacks of previous studies on socio-economic aspects of marine wildlife conservation. It further points out limitations of the

existing research guidelines pertaining to this domain.

A drawback of sociological studies on marine conservation study is the lack of a systematic research plan. Ferarro (2005) criticised the sharp contrast between sophisticated analyses on sea turtle biology and the absence of strategy in conservation studies:

For example, one speaker might present careful experimentation to test the effects of different fishing technologies on turtle by-catch. The same speaker would then describe efforts to encourage fisherman to adopt these technologies, but these efforts were not based on careful experiments, but rather intuition and anecdotes. In another presentation, a biologist might use a Bayesian hierarchical model to make inferences about population dynamics and then use rudimentary statistical tools and anecdotes to make inferences about anthropogenic influence on those population dynamics and to suggest policy interventions to change this influence.

A research on the sale of turtle-related items in Morocco (Benhardouze et al, 2004) provides us with an example. It only mentions that the study is based on visits of 37 shops in markets and fails to present the criteria in selecting each market and interviewed person.

The survey of the influence of artisanal fishery on sea turtles in Benin (Dosa *et al.*, 2007) overcame such a drawback. The following passage explains the research design in detail:

We used semi-structured individual interviews based on a pre- determined questionnaire to gather various types of information such as types of fishing gear used in the area, seasonality of use, methods of deployment, and incidental capture of marine turtles in fishing gear. In total, we interviewed 167 maritime fishers, including 24 from Benin, 2 from Togo, and 141 from

Ghana. These interviewees were selected randomly from the 21 villages of our study. The interviews were anonymous to ensure that information provided by the fishers would not be used later in law enforcement activities. To effectively gauge the impact of different fisheries on marine turtles, we conducted daily observations of different types of fisheries from November 2004 to February 2005, as they brought their gear and catch back to the villages. In total, we observed 21 groups of fishers at the end of 705 different fishing sets.

Based on this research, they reveal that the frequent incidental capture of sea turtles using specific types of gear can be observed. Admittedly, the study bears a great significance as a base-line survey. Its expanded geographical realm and a good number of persons interviewed are worth noting. Nonetheless, it remains descriptive as no analysis has been done on the data.

Even though major institutes (Burnes *et al.*, 2000, Kelleher and Kenhington, 1991) offer guidelines for designing a research on the socio-economic aspect of marine wildlife conservation, these guidelines still fail to lay out concrete procedures in interpreting the information collected. Though the guidelines help us to conduct systematic data collection, further methodological arguments are needed to achieve a desirable outcome of a social science; an insight on the mechanism behind the observed phenomena rather than merely descriptive summaries of the collected data.

4.3 Research design

This study is comprised of three stages - a document survey, fieldwork, and a social

survey.

First of all, hypotheses are formulated through observation and semi-structured interviews. Interviews conducted in fishery villages play a central role in this stage. Due to the complete lack of previous studies concerning socio-economic aspects of marine conservation in Malaysia, this stage is devoted to obtain a hypothesis on the psychological mechanism behind the behaviour of fishermen. It should be noted that the qualitative study was extremely important and should have been conducted in the first stage. In reality, neither operational variables nor indexes, which are needed for quantitative verifications, have been clearly identified because community-based conservation is a very new phenomenon in Malaysia. Even designing an appropriate questionnaire for the quantitative study is difficult at this stage.

Secondly, a document survey was conducted. The purpose of the survey was to verify the information gathered through interviews based on written records. These documents enabled the author to describe the larger context of the studied project at Ma'daerah. Information such as economic status of Southern Terengganu, major stakeholders and their interests, history of disputes amongst stakeholders, and past efforts to conserve sea turtles are revealed through this document survey. Thirdly, the author conducted a social survey at the studied villages. A quantitative analysis on the data gathered through the survey enabled the author to elaborate on the findings of the first

stage.

The total length of the main field survey was for nine months; between April 2007 and August 2007, and from November 2007 to January 2008⁴². The first five months were allocated mainly to interview the fishing community in villages and to observe conservation practices held in the sanctuary. During this period, the author stayed at Kampong Tengah in Kerteh fishery district and conducted a participational observation of the life of fishermen and their fishing activities. The last three months were mainly for the collection of printed materials and for interviewing the key informants. Interviews of the fishing community are conducted in two villages, Kampong Labohan and Kampong Tengah, close to the sanctuary. The number of interviewed persons in the fishing community was 24. This corresponds to the number of fishermen households in the targeted villages. Key informant interviews were conducted in Kerteh, Rantau Abang, and Kuala Trengganu in 2007 and 2008. Key informants are listed in Table 4.1⁴³.

Table 4.1: Key Informants Interviewed

Name (presented as initials)	Affiliation	Relationship with conservation	Data
Rahayu Zulkifli	WWF Malaysia	Field officer of	26 th August, 2007

⁴² Besides that the author visited research sites a few times for preparation in 2006 and for several supplemental data collection in 2008. Each trips lasted about for a week.

⁴³ Although the author presents date of formal interview in table 2.1, he could also get various information from them due to friendly relationships with some of them. Their advices as local intellectuals were definitely precious.

(Ms)		community-based conservation program	
Lau Min Min(Ms)	WWF Malaysia	Former field officer of community-based conservation program	17 th January, 2008
Abdullah Khasim (Mr.)	Department of Fishery	Took charge in sea turtle issues more than 10 years	8 th November,2008
Abd Halim Mat Noor (Mr.)	Department of Fishery	Chief renger of Ma'daerah sanctuary	9 th July, 2007
Kamaruddin Ibrahim (Mr.)	Turtle and Marine Ecosystem Centre	Head of the centre. In charge of administration of turtle landing beaches in Terengganu.	1 st February, 2008
Liew Hock Chark (Mr.)	Malaysian Naturalist society	Continues research and conservation practices in Redang Island as a biologist.	
Ramlee bin Abdullah (Mr.)	Fishermen Association	Head of Fishermens' Association as well as GKKK of the area.	26 th December, 2007
Amran Salleh (Mr.)	Ma'daerah community group	Head of community group and head master of a local secondary school	

Conservation activities were mainly observed at the Ma'daerah sanctuary. The author also observed environmental education programmes held in Kerteh in 2007. Various fishing activities were also observed during the stay in Kampong Tengah. Supplemental observations were conducted in Rantau Abang in 2006, Redang Island in 2007, Malacca turtle sanctuary and Fraser Hill environmental education centre in 2008,

and Perhentian Island in 2011.

4.4 Data collection

This section gives a detailed explanation on how the author collected data in the fishery villages by doing fieldwork. As the author mentioned in the first section of this chapter, socio-economic studies on marine wildlife conservation have been conducted, but often without a clear research design. Most of these studies have also not disclosed the data collection process. As a result, these studies appear to be based on a sporadic collection of anecdotes. By making the data collection process more transparent, the study tries to overcome the drawbacks of previous studies.

The section firstly discloses the sampling strategy for the semi-structured interviews and questionnaire survey. The operational code of the semi-structured interview and participant observation are introduced accordingly.

4.4.1 Sampling

There are mainly four settlements around the Ma'derah sea turtle sanctuary. These are Kampong Labohan, Kampong Gulugor, Kampong Tengah, and Kampong Telaga Papan. The sampling was based on the member list of the Fishermen's Association. As a reliable sampling ledger, only this list was available. The total number of fishermen

households listed on the member list of the Fishermen's Association was 103. According to the district office of the Department of Fishery and the chief of the Kerteh branch of the Fishermen's Association, only several households were non-members. This information was consistent with a household survey held in 1978 by Universiti Kebangsaan Malaysia (UKM). According to the survey, about 97 per cent of the fishing community were members of the association (UKM, 1978). Judging from this information, the sampling bias causing from the ledger is small enough, if any⁴⁴.

Among these settlements, only Kampong Labohan is slightly isolated. The other three settlements are part of a small town. Kampong Labohan is located within ten minutes' walking distance from the sanctuary. The other three are located about 2km south from this sanctuary. These settlements however, are under the same GKKK, and are hence united in an administrative sense. Further, inhabitants of Kampong Labohan also use shops, restaurants, and a market opens periodically, twice a week in the town. Therefore, it is reasonable to consider these settlements as an integrated body in the economic sense as well. The difference in terms of economic status amongst these settlements was hardly observed.

Semi-structured interviews were conducted in Kampong Labohan and Kampong Tengah. The number of interviews held was 6 in Kampong Labohan and 18 in Kampong

⁴⁴ According to Mohammed Raduan bin Mohammed Arif, University of Malaya, the Fishermen's Association normally consists of fishermen who are more or less supportive to the dominant party.

Tengah. This corresponds to the number of fishermen households found in the member list of the Fishermen's Association in the two settlements. In Kampong Labohan, all households were members of the association. In Kampong Tengah, there were a few households which did not affiliate with the association, according to the chief of the Kerteh branch.

The second field study in January 2012 drew 70 samples from Kampong Telaga Papan and Kampong Gulgour. The number of registered fishermen is 76, so approximately 92.1 percent of fishermen responded. The data collection session was held on the 13th of January, 2011. The fishermen were asked to visit a community centre located next to a jetty. The questionnaires were filled up on their own. The respondents were informed that their anonymity was secured.

Having explained the sampling strategy, the study should also discuss theoretical sampling, for which the founders of a grounded theory approach had emphasised. Glaser defines theoretical sampling as follows:

Theoretical sampling is the process of data collection for generating theory whereby the analyst jointly collects, codes, and analyses data and decides what data to collect next and where to find them, in order to develop theory as it emerges. This process of data collection is controlled by the emerging theory, whether substantive or formal (Glaser, 1978; 36).

In other words, theoretical sampling is constant a comparative to “tease out the emerging category by searching for its structure, temporality, cause, context, dimensions,

consequences and its relationship to other categories” (Hutchinson, 1988; 135).

Although the author acknowledges the significance of theoretical sampling in qualitative research, it was not practiced during the interview in fishing villages because the availability of detailed villager attributes was scarce, as a foreign researcher. It was unrealistic to be able to identify an informant who should contribute to developing theoretical schemes beforehand. However, the other phase of this study absorbed the essential idea of theoretical sampling which included the strategy for document survey, choice of key informants, and the questionnaire design for the quantitative survey, all of which were based on findings from observation and conducting interviews in the villages. Furthermore, the key informant interview faithfully followed Glaser’s procedure. A key informant was invited for an interview only after the analysis on previous interviews and questions that had been prepared for each key informant was completed, reflecting answers of the previous informants.

4.4.2 Operational code

This part briefly introduces the method in which the author conducted the field research. The two topics reviewed here are rapport and detailed procedures for the interview.

To conduct a field research in a foreign society, it is important to form cordial relationships with the local inhabitants. To foster trust, the author lived in Kampong Tengah, one of the settlements in Kerteh, for three months to familiarise himself with the local fishing community⁴⁵. As a result, some of the interviewees had already recognized the author well and allowed him to conduct interviews in a friendly atmosphere.

Interviews were normally held in the morning or after five o'clock in the evening so as not to disturb the fishing operation of the interviewees. All interviews were conducted in Malay by the author himself. Due to the unfamiliarity of the author to the local dialect, a member of the author's host family accompanied him. The author asked interviewees to allow for recording of the interview which all interviewees fortunately agreed to. Before starting an interview, the author announced that the interviewees could skip any of the questions, and even decline the interview. An interviewee rejected the interview request upon meeting the researcher. Another interviewee agreed to partake in the interview exercise, yet he remained silent to most questions and seemed uncomfortable. Thus, the author considered the case to be unsuccessful and omitted it from the analysis. The author also explained to the interviewees that the research did not have any relationships with levy or punishment, and they were free from any accusation

⁴⁵ During this period, the author accompanied fishery operations on a middle-size fishing boat, chatting over cups of coffee with young fishermen, and was involved in the preparation for a wedding in the village. These activities helped the author familiarise himself with some of the villagers. The author stayed at the house of the head of Fishermen's Association. This fact greatly facilitated the author to obtain cooperation from fishermen. He also managed to obtain various pieces of information from daily conversations with the host family.

and their anonymity would be ensured.

4.4.3. Limitations

This study has two limitations consequent to the sampling strategy discussed above.

The limitations are as follows:

1. Findings of this study are gender-biased. To respect the customs of a Muslim village, the author did not invite females to be interviewed. As a result, the author could fail to determine certain social costs of conservation.
2. Findings of this study can be generation-biased. Interviewed persons are adults working as fishermen. Considering that coastal fishing is an industry that is shrinking in size in Malaysia, the age distribution amongst fishermen does not faithfully represent that of the Malaysian society⁴⁶ as most fishermen are over forty years old. Assuming that the effort of environmental education in the Kerteh community does not have a long history⁴⁷, findings of the study can under-represent the voice of generation under greater influence of environmental education.

⁴⁶ Demographic pyramid of the country shapes a common pattern of the developing world. The number of youth and children in the society is greater than that of adults.

⁴⁷ Lectures offered by the World Wide Fund for wildlife are available in Kerteh area only these several years. At the same time, various educational efforts presented by Department of Fishery lasts more than twenty five years and conservation activity itself has been practiced more than forty years in Terengganu.

4.5 Qualitative Analysis

This section has two subsections. The first subsection will introduce questions for the semi-structured interview and explain the author's idea behind the questions. The second subsection will disclose the operational procedure of the analysis on the interview records, after a brief introduction on the Modified Grounded Theory approach (MGTA).

4.5.1 Interview Structure

The interview contains three major domains of interest - the perception of the fishing community on sea turtles, disputes and their settlement in the community, and villager's stakes on sea turtle conservation. This interview has twenty two questions, although some questions are skipped if necessary. Most questions are open-ended to encourage subject persons to provide their anecdotes and opinions freely. When new topics or especially interesting episodes emerge, questions to explore them are added. Serious attention was paid to the wording of questions in order for the questions to not imply the researcher's own opinion. A general sequence of the interview is as follows; questions on fishing activities are posed firstly, then onto sea turtles, and finally on the disputes concerning conservation activities. In other words, it starts from general and

neutral topics before gradually shifting towards more specific and sensitive ones⁴⁸. Let us explore the actual questions and the author's idea behind the questions:

1. Where do you come from?

Place of birth is one of the most basic attributes of a person. Sociologically saying, the social contexts of those who are born in villages and those who migrated from other places can be different.

2. How long have you lived in the village?

This question mainly aims to assess the mobility of the inhabitants. A permanent resident of a village would be more motivated by the bequest value of local natural environment (Bunce et al, 2000; 226-227).

3. How long have you lived in the village?

This question is omitted in case an interviewed person is born in the village; actually most of them are. People belongs to different cohort may act differently.

4. Do you obtain a fishing boat?

5. With whom are you operating fishery?

⁴⁸ Mohamed Raduan Mohd Ariff gave tremendous support to establish the interview guide. The wording of the questions and their sequence were decided under close consultation with him.

6. What is your role in operations?

These questions aim to estimate the social class of a fisherman in the village.

Question 4 and 5 are skipped if a fisherman owns a boat. In a traditional Malay fishery village, the ownership of a fishing boat divides social classes (Tsuji, 2002; 25, Firth, 1966).

7. Do you have another source of income apart from fishing?

8. How do you spend your time during the rainy season?

Combined with Questions 4 to 6, these questions help to evaluate the vulnerability of a household of the subject person. As Kapurusinge (2000) observed at Rekawa village in Sri Lanka, households that are exposed to economic vulnerability are compelled to over-exploit biological resources, sometimes even against regulations. Without any additional income source, a household remains more vulnerable and will suffer from the uncertainty entailing from fishery. Further, the vulnerability of fishermen households depends greatly on their subsistence during the monsoon season as fishermen are deprived from sailing during that period in the East Coast.

9. What kind fishing do you conduct from March to September?

This question serves as a clue to evaluate the concerns of fishermen in regards to sea turtles. For example, a fisherman catching ray may be reluctant to restrict gill nets

for sea turtle conservation unless conservation was able to bring him a much greater benefit than catching ray.

10 Can you describe the number of sea turtles and their conditions in earlier days?

11 What purpose did turtles have at that time?

Question 10 focuses on the recognition of inhabitants over a population trend of sea turtles and Question 11 aims to verify the information in previous studies. If an interviewee should mention egg collection, additional questions such as ‘On which beach mainly did villagers collect eggs from?’ or ‘Did villagers collect eggs of the leatherback turtle too?’ are asked.

12 In your opinion, why did the number of turtles decrease?

This question also focuses on the discrepancy between the inhabitants and biological experts. For example, if a few of the fishermen are aware of the influence of egg exploitation whilst criticizing rapid coastal development conducted by construction companies, they are not willing to give up consuming eggs. Answers to this question may reveal common misunderstandings among fishermen or specify the kind of scientific knowledge that is absent amongst them.

13 Would you explain the merit of turtles for human beings?

14 Is there any demerit for human beings?

These two questions help to understand the cost-benefit structure of sea turtle conservation from the villagers' own viewpoint. Question 12 asks the fishing community whether they see any benefit in sea turtle conservation. If they do not admit any utilitarian value on sea turtles, they are not motivated to preserve the species. On the other hand, Question 13 asks about the costs of sea turtles. As discussed in Chapter 2, local inhabitants are unwilling to support conservation activities if the protected species has some harmful effect to their lives. In short, opportunity costs they feel must be smaller than the benefit. Question 12 also tries to estimate effect of environmental education. For instance, if a fisherman mentions the value of biodiversity and the existing value of a species, he might accept the idea as a result of environmental education. In such cases, the author queried how the idea of conservation has become acceptable.

15 Do you know something about sea turtle conservation programmes conducted by certain parties?

16 In your opinion, do those conservation projects succeed or fail? Why do you think so?

Question 15 is inserted to determine two things - the fisherman's commitment to

conservation activities, and the level of presence of conservationists in villages. Those who mention community activities are likely to participate in conservation. If many of them refer to the World Wide Fund (WWF) for wildlife, it means there is great presence of the organization in the village. Combined with this question, Question 16 is asked to gauge the mindset of fishermen.

17 How do you think the population of sea turtles can be increased?

This question is closely linked with Question 11. The question also aims to grasp their recognition of fishing communitythe fisherman community over population dynamics, and to estimate the degree at which the local community share their viewpoints with conservationists. The question is intentionally put after Question 12, because the question may imprint the subject in a person that he should help to increase the population of turtles. As a result, the respondents are less likely to give anecdotes regarding sea turtle harvesting.

18 As far as you remember, are there any problems or disputes as a result of sea turtle conservation?

This question also relates with the opportunity cost of conservation projects. This question especially, tries to collect information on disputes that may undermine the

tangibility of conservation projects. There is a possibility of disputes happening amongst villagers, or between villages and other parties which may include conservationists. If a fisherman mentions problems, he will be asked to describe the problem in detail. At the same time, he will be asked how villagers chose to settle the problem.

19. Do you think the sea turtle conservation project is beneficial to certain parties?

20. Do you think the sea turtle conservation project is especially harmful to certain parties?

21. Do conservation activities directly affect your own life in a positive or negative manner?

These questions aim to identify the risks faced in terms of conservation effort, and narrowing them down to more specific and personal issues. Answers to these questions are cross-referenced with answers to all the previous questions. Cross referencing with answers concerning fishery practice, subsistence, and past harvesting practices will reveal the economic stakes of an interviewee regarding sea turtle conservation.

22. It has been said that the sea turtle population has declined because of oil mining. How do you feel about this opinion?

23. It has been said that the sea turtle population has declined because of their egg

consumption by villagers. How do you feel about this opinion?

These questions are added on to the questionnaire from the 16th interview. As discussed in Chapter 1, both oil mining and turtle egg consumption are regarded as important factors causing the decrease of the sea turtle population in Terengganu. However, these issues were not brought up until they were mentioned by the 15th interviewee. Hence, it was unclear whether they were oblivious to such issues, they felt that these matters are minor enough to ignore, or whether they felt a sense of guilt against their egg consumption. These questions were put in last because the persons interviewed may have felt uncomfortable being asked about their egg consumption.

4.5.2 Analytical procedure

The study adopted the Modified Grounded Theory Approach for qualitative analysis. This method is widely employed in fields such as education, nursing, and social welfare (Mike, 2003, Yamauchi, 2006).

Originally, the grounded theory approach was codified in the 1960s by Anselm Strauss and Barney Glaser, whilst working together in studying the sociology of illness (Strauss and Glaser, 1967). What differentiates the grounded theory approach from other methods of research is that it aims to be 'emergent'. In other words, it is a method to extract implicit theory from data collection rather than testing hypotheses deduced

from other literature.⁴⁹ A statement made by Strauss is cited below and describes the character of the grounded theory approach precisely:

The note-taking process is the first stage of understanding, requiring systematic listening without applying one's own analytic categories. In a second stage, the listener performs a simple comparative analysis of what he is hearing now, against what others (in this universe) in like or different positions have been telling him. Only then does he engage in a third stage-applying his own initial and development frameworks (Schatzman and Strauss, 1972; 69).

The grounded theory approach develops many concepts and their linkages (Strauss, 1987; 7). Its basic operation is that of discovering significant classes of things, persons and events and the properties which characterize them (Schatzman and Strauss, *op cit.*; 110) to generate a theory that accounts for a pattern of behavior which is relevant and problematic for those involved (Strauss, *op cit.*; 34). Theory is said to be grounded when it emerges from and generates explanations of relationships and events that reflect the life experiences of those individuals, groups and processes we are attempting to understand (*Ibid.*). It should be noted that “theory” in this context means “a schema composed from a series of concepts and linkages between them” (Mike, 2003; 38, Yamauchi, 2006; 38) regarding a particular subsistent domain. In other words, a ‘theory’ produced through the approach is reconstructed daily thinking of the studied persons, which are scattered fragmentally in their narratives. Therefore, it is expected to ‘fit’ their feelings and account

⁴⁹ Southern Cross University, Qualitative methodology Centre (n.d). Grounded Theory. (<http://www.scu.edu.au/schools/gem/ar/grounded>. Retrieved on 17 January 2008.)

for the studied situation. The approach was considered to be particularly appropriate when little is known about a topic and there are few existing theories to explain a particular phenomenon (Hutchinson, 1988)⁵⁰.

The Modified grounded theory approach is a simplified version of the Grounded Theory approach, putting special emphasis on studies based on interviews (Kinosita, 2003, Mike, *op cit*, Yamauchi, *op cit*). It is a systematic procedural operation to generate theory 'grounding' firmly on qualitative data. The study abided by the following operational procedure as presented by Kinosita (*op.cit*; 167-237):

1. Making a transcript of the recorded interview word by word.
2. Reading through transcripts and marking up statements closely related to the focal point of the study.
3. Coding marked up statements. The way of coding follows Strauss and Corbin

⁵⁰ There are several reasons why the author considered the grounded theory approach to be a powerful tool for foreign studies. It is a difficult task for any researcher to seize daily ways of thinking amongst a host society. Inducing original concepts through grounded theory approach can be a more productive solution than applying theoretical terms borrowed from literature. Furthermore, considering a researcher is an outsider of the host society, he can fail to be aware of even very ordinary ideas scattered in the host society. To reconfigure such daily ideas into a logical manner is meaningful for foreign study. In this respect, the grounded theory can be a good vehicle for the purpose. Moreover, literature related to a particular developing country tends to be insufficient and these studies are expected to serve as pilot surveys. The grounded theory approach is a handy tool for conducting such pilot projects with limited resources. However, whereas the Grounded Theory Approach has paid little attention for its application of foreign contexts, some adaptation is required to make practical use of the method. Simplification of theoretical sampling by the author is a tactic of such adaptation.

(Strauss and Corbin, 1994).

4. Conceptualizing ideas behind the statements. Name of a concept, its definition, variation of related statements, and the theoretical questions are documented in the format introduced earlier. As is shown in Sakai's example, statements from another interview record are added to the format when they are considered as variations to concepts.
5. Generated concepts are cross-checked with properties and dimensions of the data so as not to isolate from original data. Glaser (1978; 5) suggests the importance of this process to constantly refit categories to the data as the research proceeds to be sure they do fit all the data they purport to indicate.
6. Merging concepts into a schema. For this integration, relationships between concepts are examined following Strauss's coding paradigms, which are: conditions, action and interaction, tactics and strategy, and consequence (Strauss, 1987; 27)⁵¹.

The procedure is easy to handle and it clearly aims at dealing with interview records.

⁵¹ Using Strauss's paradigm as reference does not mean to label these ready-made categories on every concept. If one should do that, the analysis would lose its dynamics and be simple sorting of data into a ready-made mould.

These characters particularly fit with the author's needs.

4.6 Quantitative Analysis

This section briefly presents the procedure of the qualitative analysis. The first subsection discloses the structure of the questionnaire circulated in the studied villages.

The second subsection introduces the statistical techniques applied for this analysis.

4.6.1 Questionnaire Structure

The questionnaire circulated in the studied villages has two components. The first part of the questionnaire has 25 questions to gauge the perception of fishermen towards sea turtle conservation and marine resources management. The second part comprises 6 questions to identify personal attributes of the respondents.

The 25 questions developed are to measure the perception of fishermen in close reference with the interview records of these fishermen. All questions has Likert's scale varying from 1 (strongly disagree) to 5 (strongly agree)⁵². The questions are linked with seven variables identified through qualitative research. The variables are responsible

⁵² A Likert scale is a psychometric scale commonly used for a research that employs questionnaires. It is the most widely used approach to scaling responses in survey research. When responding to a Likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. Thus, the range captures the intensity of their feelings for a given item (Burns and Burns, 2008; 245). A scale can be created as the simple sum of the responses over the full range of the scale. A distinction is needed between a Likert scale and a Likert item. The Likert scale is the sum of responses on several Likert items. A Likert item is simply a statement which the respondent is asked to evaluate according to any kind of subjective or objective criteria; generally the level of agreement or disagreement is measured. Likert scaling is a bipolar scaling method, measuring either positive or negative response to a statement. After the questionnaire is completed, item responses may be summed to create a score for a group of items. Hence, Likert scales are often called summative scales.

behaviour, ownership, interest in conservation programmes, opportunity cost, dependency on government, and sense of being victimized/powerlessness. The aggregated score of the relevant questions are used to measure these seven variables to conduct a Path Analysis.

Responsible behaviour is the explained variable in the model. Responsibility here refers to the attitude of fishermen to give up particular actions, which negatively affect sea turtles. The goal of a conservation programme is basically increasing the number of fishermen with such attitudes. This variable is measured by the aggregated score of the following statements/ questions.

1. Perbuatan mengambil telur-telur penyu secara berleluasa patut dihentikan.
2. Adakah anda setuju bahawa nelayan yang menggunakan pukot pari bertanggungjawab memusnahkan penyu?
3. Nelayan-nelayan yang menggunakan pukot pari mesti dikenakan hukuman yang berat.
4. Usaha melindungi penyu adalah baik dan diperlukan.

Ownership here refers to the willingness to actively contribute to the community

where they live. This attitude should result in active participation in community programmes, including sea turtle conservation. As shown in Chapter 2, literature findings state that this attitude serves as an asset to implement a conservation programme. This study also supposes that ownership positively correlates with responsibility. The following questions are prepared to assess this.

5. Pada pendapat anda, mestikah nelayan-nelayan tempatan bertanggungjawab untuk melindungi penyu di kawasan perairan mereka?
6. Sebagai penduduk kampung, adakah nelayan-nelayan perlu melibatkan diri dalam pelbagai aktiviti yang dianjurkan di kampung mereka?
7. Nelayan-nelayan tempatan sepatutnya bertanggungjawab untuk melindungi kawasan penangkapan ikan mereka.

An interest in conservation programmes indicates to what degree fishermen are interested in programmes such as dialogue sessions and various exhibitions if they were to be offered in their villages. As these programmes are designed to increase the affection felt by fishermen towards sea turtles as well as improve their ownership, this variable is expected to positively correlate with environmental awareness and ownership. It is assumed that Question 8 correlates negatively with this factor, thus the score is given a

negative value.

8. Perbincangan tentang program pemuliharaan penyu hanya membazirkan masa sahaja.

9. Nelayan-nelayan sepatutnya melibatkan diri dalam perbincangan-perbincangan tentang program pemuliharaan penyu.

10. Ceramah tentang penyu memberi banyak pengetahuan dan menarik.

Dependency on the government in this study refers to the tendency to regard marine wildlife protection to be the duty of the government. This attitude would undermine the ownership of fishermen. In the estimated model, therefore, this variable should indicate a negative coefficient with ownership. The following questions make an assessment of this variable.

11. Kerajaan semestinya bertanggungjawab untuk memulihara penyu.

12. Kerajaan semestinya bertanggungjawab melindungi kawasan penangkapan ikan.

13. Program Pelepasan anak penyu oleh kerajaan telah mencapai kejayaan.

Opportunity cost here refers to a disadvantage which the local community incurs in exchange for sea turtle protection. As discussed in Chapter 2, past literature has pointed out that the successful implementation of a conservation project rests greatly on the mitigation of opportunity cost. In the context of the villages studied, the greatest opportunity cost is the restriction of ray nets. If turtle egg collection is entirely banned, it would also result in an opportunity cost. On the other hand, there will be an increase of tourist arrival that can partially offset that economic disadvantage. Another 5 questions have been prepared in this study to extract information on opportunity cost, and this is shown below. Statement 18 is deemed to correlate negatively with the factor and is therefore given a negative value.

14. Telur-telur penyu ialah hak milik nelayan tempatan.

15. Hasil penjualan telur penyu adalah lumayan.

16. Nelayan menggunakann pukot pari kerana hasil tangkapan adalah lumayan.

17. Penyu mengganggu operasi penangkapan ikan yang dijalankan oleh nelayan-nelayan tempatan.

18. Penyu akan meningkatkan bilangan pelancong ke kawasan ini.

Environmental awareness here refers to the attitude of caring for sea turtles and the marine environment in general. The study views awareness to positively correlate with responsibility. The models also assume that programmes offered in villages would improve environmental awareness. In the questionnaire, the following questions are prepared to gauge environmental awareness.

19. Usaha pemuliharaan penyu adalah penting.

20. Pemuliharaan alam sekitar adalah penting.

21. Pemuliharaan kawasan penangkapan ikan adalah penting.

A sense of being victimized refers to the common notion amongst fishermen, who regards themselves as victims of over-exploitation from outsiders in the form of foreign boats and trawlers. A sense of powerlessness tied to this notion, where these fishermen regard themselves as too weak to cope with the problems caused by the outsiders. The study assumes this pessimistic attitude to affect negatively on ownership. The questionnaire contains the next four questions to assess these two concepts. Question 25 is considered to correlate with the factor negatively and therefore its score is given a negative value.

22. Penyu semakin berkurangan kerana perbuatan nelayan-nelayan dari negara jiran.
23. Penyu semakin berkurangan disebabkan penggunaan pukot tunda.
24. Nelayan tidak mempunyai kuasa untuk mengawal kawasan tangkapan ikan mereka.
25. Penyu berkurangan kerana perbuatan orang-orang kampung di sini.

In addition to the 25 questions introduced above, the questionnaire is also constituted of 6 other questions which concern personal attributes of the respondents as follows:

1. How old are you?

- a. Younger than 30 years old b. 31-45 years old c. 45-60 years old d. More than 60 years old

2. Where are you from?

- a. Kerteh b. Elsewhere

3. Are you a member of MEKAR group

- a. Yes b. No

4. What is your status on fishing activities?

- a. Owner of an A class boat b. Owner of a B class boat c. Owner of fibre class boat d. Clew e. Other
5. What is your highest academic qualification
- a. Primary school b. Lower Secondary school c Higher Secondary School d, Diploma or Higher degree e. Other
6. As a resident of an oil and gas industry area, what kind of relationship do you have with the industry?
- a. Having a part time job
 - b. Having a family member that works for the industry
 - c. Having no relationships
 - d. Other

These questions are used to categorise the respondents, and testify whether these attributes affect the attitudes of respondents.

4.6.2 Analytical procedure

The quantitative part of the study will go through three analytical steps. These steps are Exploratory Factor Analysis (EFA), Analysis of Variance (ANOVA) and Path Analysis. Technical explanations in this subsection are based on Adachi (2006), Hirai (2012), Kojima and Yamamoto (2003), Kim and Mueller (1978a, 1978b), and Sigemasu

et al. (2008). Additional information was also drawn from internet resources (Trochim, 2006, Moriyasu, 2007, Uebersax, 2006, Olyvides & Forero, 2010, Dean and Illosky, 2012).

The Exploratory Factor Analysis (EFA) is a statistical method used to uncover the underlying structure of a set of variables. The overarching goal of EFA is to identify the underlying relationships between measured variables. Even though this method is normally used when a researcher does not have prior hypotheses, the study uses it to compare its result with the result of MGTA. Kim and Muller (1978a; 46-47) summarise steps to obtain a solution of the analysis as follows:

- (1) The data collection and preparation of covariance matrix;
- (2) The extraction of initial factors; and
- (3) The rotation to a terminal solution and interpretation.

As there is no special topic to explain the first step, let us explore the rest of the procedures.

Firstly, it is necessary to find an initial solution that adequately explains the correlation amongst the observed data. An initial solution will be obtained through fitting procedures, which estimate the factor loadings and unique variances of the model. Though various fitting procedures exist, the study adopts principal axis factoring. The said factoring procedure is chosen because of several advantages. Firstly, it is applicable to samples even when the assumption of normality of distribution has been violated⁵³. It

⁵³ Concerning normality in a statistical sense, see Illosky and Dean (Illosky and Dean 2012, *Collaborative statics*).

is also less likely to result in an improper solution, compared to other commonly used methods⁵⁴.

Second, the number of factors adopted should be decided. Generally speaking, a Factor Analysis should find out the minimum number of factors compatible with data (Kim and Mueller, 1978b; 41). Even though various criteria for this operation exist, the study uses the eigenvalue specification which is known as the most heuristic method (*Ibid*; 43). It simply retains factors with eigenvalues greater than 1.

Third, the rotation to seek a terminal solution is required. A feature of Factor Analysis is that any solution with two or more factors has an infinite number of orientations of the factors explaining the data equally well. Therefore, a single solution with a simple structure, from the infinite possibilities should be chosen. Rotation is the procedure to arrive at such a solution. There are two types of factor rotations - the orthogonal, and the oblique rotation. Orthogonal rotations constrain factors to be uncorrelated, while oblique rotations permit correlations amongst them. In the social sciences, there is often a theoretical basis for expecting factors to be correlated. Therefore, applying the orthogonal rotation is not realistic because it ignores this possibility. This study adopts the latter because the assumption of independence amongst the factors is not

<http://cnx.org/contents>. Accessed 24th August, 2014

⁵⁴ For further detail of features of the fitting procedures and their mathematical grounds, see Kim and Mueller (1978b; 21- 29).

suitable in this context⁵⁵.

In addition to the procedures shown above, the study examines the suitability of data for Factor Analysis. For this purpose, the study used the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's test of sphericity⁵⁶. The former indicates the proportion of variance in the variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a Factor Analysis may be useful with the data being analysed. If the value is less than 0.50, the results of the Factor Analysis is not useful. Bartlett's test of sphericity examines the null hypothesis that the sample correlation matrix is an identity matrix, which would indicate that the variables are unrelated and are therefore unsuitable for structure detection. The Factor Analysis can perform a compression of the available information only if we reject the null hypothesis. Small values (less than 0.05) of the significance level indicate that a Factor Analysis is useful with the data.

Analysis of Variance (ANOVA) is a statistical model used to analyse the differences between group means (Sigemasu et al 2008, p89). In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are equal. A test result (calculated from the null hypothesis and the sample) is called statistically significant if it

⁵⁵ Amongst the procedures of oblique rotation, the study chose promax rotation.

⁵⁶ The explanations on the two tests is based on the IBM's online material. (http://pic.dhe.ibm.com/infocenter/spssstat/v22r0m0/index.jsp?topic=%2Fcom.ibm.spss.statistics.cs%2Fspss%2Ftutorials%2Ffac_telco_kmo_01.htm, accessed 15th August 2014). For further detail of the technique, see Field (2013; ch.17).

is deemed unlikely to have occurred by chance, assuming the truth of the null hypothesis.

A statistically significant result, when a probability (p-value) is less than a threshold, allows the rejection of the null hypothesis. In the typical application of ANOVA, the null hypothesis is that all groups are simply random samples of the same population⁵⁷. The study adopted this technique to testify whether personal attributes of the respondents affected their attitudes toward conservation.

Path Analysis is used to describe the directed dependencies amongst a set of variables. The analysis can be viewed as a special case of structural equation modeling where only single indicators are employed for each of the variables in the causal model. In Figure 4.1 below, the two exogenous variables (Ex_1 and Ex_2) are modeled as being correlated and as having both direct and indirect (through En_1) effects on En_2 (the two dependent or 'endogenous' variables). The endogenous variables are also affected by factors outside the model (including measurement error). The "e" refers to error terms in

⁵⁷ ANOVA uses traditional standardized terminology. The definitional equation of sample variance is $s^2 = \frac{n-1}{n} \sum (\bar{x}_i - \bar{x})^2$, where the divisor is called the degrees of freedom (DF), the summation is called the sum of squares (SS), the result is called the mean square (MS) and the squared terms are deviations from the sample mean. ANOVA estimates 3 sample variances: a total variance based on all the observation deviations from the grand mean, an error variance based on all the observation deviations from their appropriate treatment means and a treatment variance. The treatment variance is based on the deviations of treatment means from the grand mean, the result being multiplied by the number of observations in each treatment to account for the difference between the variance of observations and the variance of means (Sigemasu *et al*, 2008; 91-94).

the model.

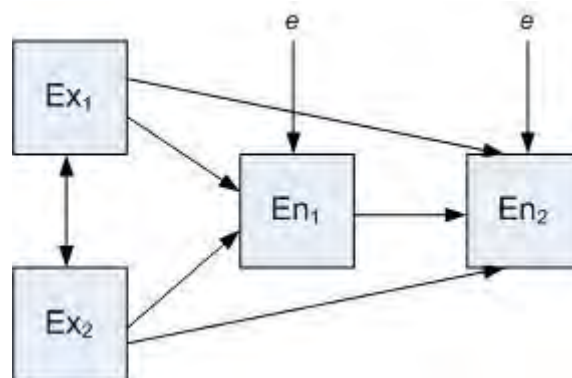


Figure 4.1: An Example of Path Model

(Source: Kojima and Yamamoto, 2003; 110-111)

The study uses this technique to testify hypothetical model obtained from qualitative analysis. The variables are measured by aggregated scores of the Likert's scale items. The validity of the entire model and path efficiency among the variables are sequentially statistically testified.

4.7 Summary

This chapter has introduced all the methods used for the entire study. The first section presents the methodological problems of the previous studies in social science on sea turtle conservation. The problems identified are a lack of systematic survey and analysis. Even guidebooks published by major institutions only tend to show measures

for systematic data collection without presenting a strategy for coding, model-building,

and testing.

Having criticised such problems, the second section presented the study's own research design. It includes participant observation, a semi-structured interview, an archive survey, and a questionnaire survey. For analysis, it uses both qualitative and quantitative methods. The study is thus a mixed methods research study. Further, the study is designed to complete a cycle from hypotheses building to its empirical test.

The third section disclosed the study's data collection process. The study has clear geographic focus for data collection. Fishermen from four villages neighbouring the sanctuary were chosen as the target of data collection. The key persons of the projects are also interviewed.

The fourth section accordingly reviewed the methodology of the qualitative analysis, which aims at obtaining hypotheses. The method used for analysis is the modified grounded theory approach, which has been widely applied in studies for education and social work.

The fifth section introduced the questionnaire design and statistical techniques applied for quantitative analyses. The methods applied for the analyses are Exploratory Factor Analysis, Analysis of Variance and Path Analysis. The first method is used for identifying factors affecting the attitude of fishermen. The second method examines effects of personal attribution on the attitude of fishermen pertaining to conservation. The

third method testifies for the hypothetical model obtained through qualitative analysis.

Up to here, the chapter has disclosed the methodology of this study in detail. It was the mandate of the chapter to ensure that the auditability of findings presented in the following two chapters is sound.

Universiti Malaya

CHAPTER 5: FINDINGS: LOCAL CONTEXT AND STAKE HOLDERS' INTERESTS

5.1. Introduction

The chapter has three objectives. First of all, it describes the context of the local economy in Southern Terengganu. Next, it identifies the interests of the major stake holders of sea turtle conservation. Finally, it describes how the existing consensus was achieved by the stake holders.

These objectives all correspond with the objectives of the entire study, which are presented in Chapter 1. The function of the chapter is to illustrate the context in which the Ma'daerah project is embedded. As discussed in Chapters 1 and 3, a conservation project does not emerge from vacuum. Any project is a consequence of a series of strategic choices of the relevant parties under certain conditions. This chapter tries to depict such dynamics.

The framework of the chapter is political ecology. Conservation entail crucial economic and livelihood decisions in society; control of land, water, mineral, and biological resources and the permission to use them are realm of secular power (Borrini-Feyerabend and Tarnowski 2005; 75). Bryant and Bailey (1997; 21-41) also highlights politics regarding natural resource management as follows:

1. Environmental problems cannot be understood in isolation from the political and economic context within which they are created. To describe the problems is simultaneously to consider the political and economic processes that generate or exacerbate those problems.
2. How actors inside and outside the state can influence the environmental management priorities of state agencies to favour the allocation of finance and human resources to certain environmental projects and problems. Either to remedy environmental problems or to establish support desirable environment, projects reflects the power struggle.
3. Power is also linked to the attempted regulation of ideas. It is a matter of winning the battle of ideas over human use of the environment, since actors seek to legitimate their individual interests over the interests of others through an attempt to assimilate them to 'the common good'. Powerful actors can also seek to maintain or enhance their power over environment by controlling 'socially acceptable' version of events.

Within this framework, the chapter tries to explore how existing problems links to economic structure of the state, how local economy reflects on decisions regarding

conservation projects, how the problems are interpreted, and how the interpretation reflect interests of actors. The arguments will proceed as follows.

Section 2, Arena: Southern Terengganu features the area where Ma'daerah is located. Ma'daerah is a part of the Paka-Kerteh rookery. In terms of administration, the rookery is in the Kemaman district. The district has experienced intensive land development since an off-shore oil and gas platform in Kerteh started its operations in 1981. From the view point of conservation, it means a drastic loss of nesting beaches. On the other hand, the industrial complex has greatly uplifted the regional economy in the district. This means that our core case study does not overlook poverty unlike many cases introduced in Chapters 2 and 3.

Section 3, Stakeholders, explores motivational factors of main stake holders to conserve sea turtles in Terengganu and what recently led them to a community-based project in Ma'daerah. Three stakeholders dealt with here are the petrochemical industry, fishery officers, and the state government. Conservancies such as WWF Malaysia and Malaysian Naturalist Society do not appear here because their mandate is, without a doubt, conservation.

Section 4, Rantau Abang Agreement, reviews how the existing conservation strategy was decided. The National Strategy Workshop held in 1983 at Rantau Abang was the crucial turning point to direct strategy for sea turtle conservation. The focus of the

part is the political role of the petrochemical industry. It also depicts why the adopted regulations were particularly severe for small scale coastal fishermen. These arguments are followed up by the core section of the chapter.

Section 5 covers the Ma'daerah sea turtle sanctuary. The section revisits how the manager launched and operated the sanctuary and how fishermen responded to the offered programme, in line with the concepts of co-management and community-based conservation reviewed in Chapter 3. In short, the study considers the programme to be a successful case of co-management, although it is still far from being a community-based conservation programme. The section also reveals that the sanctuary has insufficient impact to replenish the sea turtle population.

Section 6 being a topic on 'Unsettled Issues', reviews the major points that remain unsettled amongst the stake holders. Turtle egg collection licensing and eco-tourism are the points to note. These points are actually important for the local fishermen because turtle eggs and tourism could be a source of additional income, and as a matter of fact, both merit sea turtle conservation.

Section 7, Discussion, summarises the findings of the chapter. The vantage point presented through this chapter is that a conservation project is a political game amongst stakeholders.

5.2 Arena

This part describes the arena of the main case study. There are four points here. The first point is that the area experienced very rapid development in these decades, especially since the advent of crude oil in the late 1970s. The second point is that the regional economy chiefly depends on the petrochemical industry. As described later, the area is now known as the Southern Terengganu Petrochemical Cluster. The area, which serves as the centre for the petro-chemical industry and as the main provider of oil and gas in the nation, bears crucial importance to the country. The third point is that the regional economy is very much flourishing to the point that poverty in the district could be almost entirely eradicated. Lastly, the fourth point is that the drastic development of the region deprives turtles of two major rookeries in the state. Various facts presented in this part will serve as key terms to be mentioned in the following discussion of the chapter.

5.2.1 Southern Terengganu

In Terengganu, there is a clear contrast in terms of economy between the northern and southern parts. Agriculture and fishery dominates the northern part while heavy industry plays a crucial role in the south. For instance, over 75 per cent of 1595.5 ha industrial area of the state was located in the south in 1997 (Unit Perancangan Ekonomi Negeri Terengganu, 2001; 14), and the concentration here remains unchanged up until

today. This accounts for a higher standard of living and a greater degree of urbanization in the South. Within Southern Terengganu, Kemaman is especially known for the Petrochemical industry. It serves as the stronghold of the national petroleum company namely PETRONAS and has attracted massive amounts of investment.

Before the advent of petroleum in 1973, the southern area of Terengganu was a frontier. A factor that triggered the development of Southern Terengganu was the construction of Road No.3 running parallel to the shoreline in the 1950s. Clearance of jungle started for road construction, and eventually for the development of agriculture. It resulted in the bloom of the logging industry. The clearance enormously expanded its scale when the federal government launched a 44,386 ha rural development project named Ketengah on 12th April 1973 under the Parliament Act 104/73 (Lembaga Kemajuan Terengganu Tengah *et al.* n. d.; 5. Unit Perancangan Ekonomi Negeri Terengganu, 2005). Under the Ketengah schema, the federal government conducted large scale reclamation to provide new agricultural land in the interior parts as well as building several new towns at the coastal areas. Kerteh was one of the towns built during this period. As a consequence of the aforementioned development, the population in Southern Terengganu dramatically increased. At the same time, the construction of road provided businessmen involved in the fishery industry with better access to the market. Siow (1987; 7) points out that the improved access greatly stimulated the fishery industry to intensify

their fishing efforts. Not only that, construction, logging, and sawing labourers migrated into the region during the same period⁵⁸. Logging also enabled some local businessmen to begin accumulating capital.

In 1974, crude oil was found offshore. After this event, the area experienced even greater change. ESSO Malaysia constructed a platform for off-shore mining and began its operations in 1979. Eventually, the rustic region with sporadic fishing villages was turned into a gigantic petrochemical industry complex which now plays a cardinal role in the Malaysian economy.

5.2.2 Petrochemical cluster

This subpart describes petroleum mining, the petrochemical industry, and the impacts on Southern Terengganu. Economically saying, the impacts which include investments to the industrial corridor, royalty to the local government, demands for small businesses, and the influx of industry professionals to the neighbouring towns has boosted the regional economy tremendously. The presence of the petroleum industry in the state is very dominant. It also plays a cardinal role in the Malaysian heavy industry. However, as far as sea turtle conservation is concerned, the industry is a serious threat which greatly affects the two major rookeries of the reptile.

⁵⁸ Ramlee bin Abdullah, head of Fishermen's Association in Kerteh and Kemasik was one of the immigrant workers. In the mid 1970s, he came to Kerteh as a lorry driver and worked for a logging company. After he had decided to be a permanent residence of the village, he purchased a small boat and obtained a license for fishing.

Malaysia has four major fossil fuel reserves; Miri, Bintulu, Labuan, and Kerteh. Among these, Kerteh is the only reserve in Peninsular Malaysia as the others are located in East Malaysia. The petroleum reserve in Terengganu was 1606 million barrels in 1983, which accounted for 62.5 per cent of the total reserves in Malaysia. The natural gas reserves in Terengganu is estimated at 25.8 trillion cubic feet which is equivalent to about 52 percent of the total reserves in Malaysia (Japan International Cooperation Agency, 1985; section2-24).

Southern Terengganu bears considerable significance as the only reserve in the Peninsular Malaysia, although its presence relatively declined as the development of reserves in Sarawak progressed. It has easy access to centres of consumption owing to its strategic location⁵⁹. This advantage has bloomed the petro-chemical industry there. PETRONAS started considering the establishment of an olefins-based petrochemical complex⁶⁰ in Southern Terengganu as early as the late 1980s (Japan international cooperation agency, *op. cit.*; section IV-36). Just 5 years after commercial drilling had started, there were 10

⁵⁹ A petro-chemical complex also requires two more conditions to locate:

- i . Adequate supply of industrial water
- ii . Easy access to a port with an adequate distance from inhabited areas

Terengganu enjoys abundant water supply due to its great precipitation. Kerteh area is located 120km south from Kuala Terengganu, which is the most densely populated town in the state.

⁶⁰ Petrochemicals are ordinarily considered as being produced either from a gas such as ethane, propane, or butane, or from a liquid such as naphtha or gas oil which yield, in the latter case, mostly olefins and aromatics.

oil plants which produced 130 thousand tonnes a day (Unit Perancangan Ekonomi Terengganu, 1983; 2). The advent of the petrochemical industry entailed many large construction projects to the region. Table 5.1 below summarizes the major construction projects:

Table 5.1: Major Construction Projects for the Petrochemical Industry in Southern Terengganu

1. Terengganu Crude oil terminal at Kerteh
2. Crude oil refinery at Kerteh
3. Peninsular gas project – Offshore and on shore
4. Supply base at Tanjong Berhala
5. Airport at Kerteh
6. Housing complex
A. Rantau Petronas at Kerteh
B. Petronas Interim housing and office at Kerteh
C. Lot 144 at Cukai
D. Bukit Kuang
7. Kerteh new town
8. Telok Kalong industrial park
9. National electricity board's Paka plant
10. Upgrading electric transmission and distribution system
11. Upgrading water supply
12. Bypass road to Telok Kalong industrial park and other road construction

(Source: Unit Perancang Ekonomi Negeri Terengganu, 1983;4)

These projects have enormously boosted the construction industry, which has been the second largest industry of the state since then.

Another significant impact of the petro-gas reserve is its contribution to the revenue of the state. In a special meeting convened on March 22 1975, the State Executive Council of Terengganu agreed to the proposal made by PETRONAS regarding the cash payment of 5 percent on the crude oil price won in the state and sold by PETRONAS, its agent and

contractors (Petroleum Development Act, 1974; Act 2- 2). To the present day, royalty from oil and gas accounts for around 70 per cent of the local government's revenue. Further, the petrochemical industry has created adequate demands and improved purchasing power in the region. Table 5.2 indicates that many small businesses began their operations in the late 1970s. Between 1978 and 1984, 47 percent of Malay-owned businesses and 23.9 percent of non-Malay owned businesses accounted for the number of entities launching their own businesses.

Table 5.2 : Operation Years of Small Business in the Southern Terengganu

	Malay	Percentage	Non-Malay	Percentage
0-2 years	25	24.5%	10	13.3%
3-5 years	10	9.8%	4	5.3%
5-6 years	13	12.7%	4	5.3%
7-8years	13	12.7%	4	5.3%
9-10years	8	7.8%	9	12.0%
11-15years	13	12.7%	8	10.7%
16-20years	11	10.8%	10	13.3%
Over 20years	9	8.8%	26	34.7%
Total	102	100.0%	75	100.0%

(Source: Universiti Kebangsaan Malaysia, 1984; 295)

Moreover, the industry has resulted in the growth of various kinds of downstream industries. Japan International Cooperation Agency (Japan international cooperation agency, 1986; II) pointed out that the backward inter-industrial relationship of petroleum mining would create a demand for industries listed in Table 5.3 in the next page⁶¹. Local

⁶¹ A controversial point regarding this backward inter-industrial linkage was whether the oil industry has benefitted local companies well enough. Universiti Kebangsaan Malaysia criticized that local businesses could only get lower service job opportunities,

households could also create opportunities to earn an extra income through providing carpentry, boat and fork-lift operation, and food supply. In addition, the region has also seen a massive influx of engineers, consultants, and managers with high incomes. Their great purchasing power has stimulated the commercial development of towns such as Kemaman and Kuantan. To provide these professionals with comfortable accommodation, Kerteh new town and other housing complexes were also constructed.

Table 5.3: Supply and Spin-off Industries related to the Petroleum Complex

Supply	Drilling chemical supply, Oil well cement and additive supply Lubricant and grease supply
Instruments	Casing handling tools supply, Rockbit supply, Wire-rope supply General hand wane supply, Metering Supply, Marine safety equipment supply, Line pipe production, Lifting equipment supply with testing facilities, Chain, Anchors and Tackele supply, Flayars, bolts and nuts supply, Oxygen, Acetylane and general industrial gas supply
Engineering	Oil well cement and mud engineering laboratory, Oil field tubular repair shop, Machine shop for subs and drill Down whole oilfied tool rental and repair shop Well production testing series and equipment supply Fishing and casing cutting services and tool rental facilities Marine diesel repair facilities Sub-sea driving services and equipment supply, Apt tubular inspection service NDT inspection service Calibration services
General Service	Crane and folk lift rental and maintainance, Trucking service including hot-shot service Freight forwarding services, Ship Agency services
Others	Food supply to offshore catering companies, Bedding, housekeeping and kitchen equipment supply, Labour and manpower supply

(Source: Drawn by the author in reference to Japan International Cooperation Agency, 1985; II)

therefore the multiplying effect of the industry is smaller than that expected for Japan International Cooperation Agency (Universiti Kebangsaan Malaysia, 1984; 146).

The development of spill-over industries eventually turned the shoreline from Paka to Cukai into a heavy industrial corridor. Combined with the northern part of Pahang, the whole region of 80km length is now known as “the Petrochemical cluster” and is regarded as one of the most crucial industrial areas in the country until today (Malaysia, 2009; 13-14).

The heart of the petrochemical cluster is Kerteh. An underwater pipeline with a length of 213 km connects off-shore oil and gas wells to a refinery station in Kerteh (Unit Perancangan Ekonomi Terengganu, 1983; 44). From the refinery, a major component of the fossil fuel is exported mainly to East Asian countries such as South Korea and Japan. The rest of the gas extracted goes to other industrial parks in South Terengganu, and a power plant in Paka. Pipelines starting from Kerteh are connected to a distance as far away as the Kelang Valley, Johor Bharu and Singapore (Petronas Gas, 1985; 2, Chan systems, 1986). In Kerteh, there also exists a gigantic petrochemical complex to function as the flagship of the corridor. The centre of this complex is an ethylene plant, which is holds key feedstock for the production of petrochemicals; whilst surrounding plants produce plastic film, sheet pipe, and other plastic items (Japan International Cooperation Agency, 1986; Section I -2). The chemical products from the complex have facilitated rapid industrialization of the country. Artificial rubbers and ethylene glycol contribute to the auto-manufacturing industry while plastic films for insulation of electrical wires and

cabling are used in home electrical appliances (ZMB corp, 1985, Chan system, 1986).

Heavy industry factories in South Terengganu are integrated with the Kerteh complex via a pipe line. They are directly connected with a pipeline to provide the material - oil and gas. At Telok Kalong, the national gas company, Petro-gas, produces various kinds of chemicals and plastic products such as varnish and lacquers (Japan international cooperation agency, *op.cit*; section III-8) . Besi Waja Corporation operates an iron mill which can produce 602 thousand tonnes of sponge iron annually at the place (Unit Perancangan Ekonomi Terengganu, *op. cit.*; 50). Kemaman is also a centre for the chemical industry. For example, Tioxide Corporation produces Titanium dioxide there. A natural gas thermal power plant at PAKA generated over 900 MW to underpin operations of these large factories in the corridor (Unit Perancangan Ekonomi Terengganu, *op. cit.*; 58-59). The Port of Kemaman handles international trade for these heavy industries. In 1996, for instance, the port handled 1,309,541 tons of steel from Perwaja Steel, 746,134 tons of liquefied petroleum gas from Petro Gas, and 241,097 tons of items from Tioxide (Lembaga pelabuhan kemaman, 1996; 10).

5.3 Stake holders

This part describes the interests of the three main stake holders of marine environmental protection in Southern Terengganu; the petrochemical industry, the fishery industry, and the local government. The section reveals that both the petrochemical

industry and the fishery sector have had to pay attention to environmental issues; and both the petrochemical industry and the local administration have been interested in community-based projects. This discussion prepares for the next part of the chapter – the kind of consensus that can be achieved amongst these three parties.

5.3.1 Petrochemical industry

In Terengganu, the petrochemical industry far exceeds any other industries and organizations in terms of scale and influence. Winning support from the industry bears a vital importance for any project's success in the state. The industry, fortunately, acts as a tolerant supporter of environmental projects in the state. The industry gives priority to projects in Kerteh; for instance, where BP finances the Ma'daerah sea turtle sanctuary and ESSO supports the Kerteh environmental education centre. This subpart manages to distinguish that such financial offers are indispensable costs to ensure the smooth operations of the petrochemical complex.

5.3.1.1 Potential Conflict in Kerteh district

The production of oil and gas is critically combined with this specific location for fishery activities. Therefore, in keeping a good relationship with the local community, if any, is a method to better manage platforms⁶². In the case of the Southern Terengganu

⁶² There also exist cases which mines were found in deserted places without original community. In these cases, all inhabitants of the area are migrant labours and their interest is consonant with mines. Oil mills in the Middle East present us with examples.

petrochemical complex, the original residents of the area were predominantly fishermen.

Table 5.4 indicates the occupation of head of households in the region in April 1983⁶³. It

shows that fishermen outnumbered other occupations.

Table5.4: Occupations of Heads of Households in Paka-Kerteh region in April 1983

Labour	118
Fisherman	116
Merchant	88
House wife	50
Carpenter	45
Taxi driver	31
Government officer	25
Clerical	19
Family worker	17
Fermer	11
Hawker	5
Trishaw man	3
Artisan	3
Salesman	2
Others	79
Unemployment	124
Total	736

(Source: Universiti Kebangsaan Malaysia, 1984; 175)

The fishery community once severely antagonized the petrochemical industry.

Three years after the petrochemical complex launched their operations, Universiti

Kebangsaan Malaysia (hereinafter abbreviated as UKM) reported fierce conflicts

between the local fishermen and the petrochemical industry as follows:

Offshore Terengganu around Tanjung Berhala, Telok Kalong and Kerteh area is a rich fishing ground. The activities of the oil industry are bound to disturb and pollute the area. The development of Platform, rigs and

⁶³ The region here refers to the coastal villages from Paka to Cukai.

pipelines in the offshore areas and landfall terminals in and around this area are in direct conflict with the fishing industry. Fixed installations such as the oil pipelines are protected by a 2 mile zone along the pipelines from landfall terminals to the production platform from vessel penetration to avoid causing damage to them (UKM, 1984; 162)

Fishermen are resentful of the oil industry around the area for it has robbed them of their livelihood. Fish tend to cluster around the pipeline and platforms because that is their traditional breeding ground and perhaps because of the availability of food around the area but fishermen are not allowed to follow the fish. This has naturally led to the decline in their catch from this area (Ibid; 163)

The construction of the oil and gas pipelines from landfall terminals in Kerteh to the oil and gas fields offshore has disturbed the inshore shell fisheries. Pipeline routs such as those which cross inshore waters are liable to result in partial destruction of the major shell fish beds and the fish traps and fish houses found all along the proposed pipeline roots (Ibid;163)

UKM further reported that PETRONAS offered a total of RM17, 300 as compensation to fishermen households and promised to construct a playing field in the area to further compensate. The offer however, did not satisfy fishermen because the fishermen had originally requested RM2 million as compensation (*Ibid; 165*).

The document vividly shows us the tension between the petrochemical industry and the local fishing community during the early days of the petrochemical complex⁶⁴.

Neither recent disputes nor a reconciliation between the two parties have been

⁶⁴ Regarding to this point, PETRONAS and ESSO contradicted as follows:

The 1978 Fisheries statistic reveals that the Dungun and Kemaman Fisheries district have the lowest annual catch of about 8,000 tones and compared with 27000 tonnes in Besut and 15000-16000 tonnes in other northern Fisher District. The lower annual catch in Dungun and Kemaman is not the result of reduced fishing activities but is a consequence of less productive fishing grounds. The fish density off Paka-Kerteh area is estimated at 3-8 tonnes per sq. nauticle mile as compared with a much higher density average of about 10-12 tonnes per square mile fir the whole of Terengganu (PETRONAS and ESSO, 1981; 79).

documented⁶⁵. However, judging from the severe antagonism faced in the past, it is presumable that the petrochemical industry needs to handle the local community properly to prevent reigniting the resentment of fishermen.

5.3.1.2 Criticism against pollution

Criticism against negative environmental effects of the petrochemical industry has lingered on in the state. Early criticism was actually related with sea turtles. Environmental impact assessments of the petrochemical complex conducted by JICA (JICA, 1986; section 8-9-2) mentioned that the loss of sea turtle habitats is the most critical environmental damage pertaining to the petrochemical complex. Foreign conservationists (Mortimer, 1986; 10, Bennett, 1987) also raised their concern for damage to the species stemming from this industry. Since Terengganu was known as the only place in the Asia Pacific region where severely endangered giant leatherback turtles nested, these concerns could entail a worldwide campaign to condemn the companies. This explains the reason that companies have paid special attention to sea turtle conservation.

Further, criticism against pollution emerged in the 2000s when concern on the degrading environment came to be an important agenda in Malaysian politics. At the national level, for instance, the ninth Malaysian plan was published in 2006 and presented

⁶⁵ A possible interpretation is that the fishermen have slowly understood economic benefit of the complex because of additional income, alternative employment, and financial support to community activities. The author must set aside this question for study in future.

a concern about the degrading ecosystem of the country as follows:

Local authorities have an important role in ensuring clean and environmentally friendly surroundings in which people can work and live in more conducive lifestyle. A conducive, clean and nature-friendly environment in residential and commercial areas will directly assist in inculcating a 'first class mindset' amongst the citizens (Malaysia, 2006; 42)

I am deeply saddened by what is happening to the nation's water resources. Contamination has killed off much of our aquatic life. Rivers that were once abundant with fish, prawns and terrapins are now barren (Malaysia, 2006; 45)⁶⁶.

These remarks enunciated the wane of the era which condoned pollution for the sake of economic growth. In Terengganu, pollution and toxic waste also evoked criticism in the early 2000s. Malaysian Technology University (hereafter abbreviated as UTM) described the serious status of the local environment as follows:

Sekitar perairan di Negeri Terengganu adalah tercemar. Kandungan E-coli yang tinggi disebabkan oleh bahan kumbahan dibuang ke sungai tanpa proses reratan dan berlakunya tumpahan minyak di sekitar perairan (UTM, 2000; section 1.0-6)

Masalah tapak pelupusan sampah yang membawa kesan alam sekitar dikenalpasti di daerah Dungun dan sebahagian di daerah Kemaman (Kaedah pembakaran terbuka) kesukaran mendapatkan tapak pelupusan dan bahan penutupan yang sesuai di tapak pembuangan sisa pepejal antara faktor masalah pengurusan sisa pepejal (Ibid.)

⁶⁶ "I" in this context refers to Tan Sri Abdullah Badawi, the Prime Minister of Malaysia at that time.

The State administration was also very concerned about the deteriorating status of the natural environment. Its sense of crisis was professed in the ten year state development plan edited by the Economic Planning Unit in 2001:

Mengawasi dengan sewajarnya pembuangan sisa ke udara (dalam bentuk gas beracun, zarah/habuk) dan industri kimia dan petrokimia, perlombongan, dan pembinaan serta pengangkutan untuk menjamin kualiti udara yang bersih (Unit Perancangan Ekonomi Terengganu Darul Iman, 2001; section DF-5).

Memastikan penggunaan pesisiran pantai untuk industri pelancongan dan nelayan tidak disalahgunakan seperti pembuangan sisa pepejal dan kerajaan perlu mempunyai perancangan pengawalan hakisan pantai daripada aktiviti pembangunan yang mengganggu proses-proses daya semula jadi di pesisiran pantai (Ibid; 103).

The administration did not hesitate to criticize the petrochemical giants, even though the economy depends heavily on them. The paper mentioned the closure of several factories as stated below:

Membangun dan melaksanakan pelan pembangunan tempatan mengukuhkan strategi untuk mencipta persekitaran yang selamat untuk kesihatan. Peranan kerajaan di dalam membuat penilaian semula kilang-kilang yang beroperasi untuk tidak melepaskan asap yang membahaya di udara dan menutup kilang-kilang yang melakukan aktiviti yang bertangan dengan lesen yang dikeluarkan dan tidak mematahi syarat yang telah ditetapkan (Ibid; 67).

As these documents show, environmental concerns were culminated in the 2000s. The criticism was a potential risk for the industry if it were to be further ignited. For petrochemical companies, financial support to various environmental projects is considered a means to pacify and mitigate this latent risk.

Besides the two sea turtle sanctuary projects, the industry supports the Pulau Redang Marine Park and Environmental Education Centre in Kerteh. Pulau Redang Marine Park is the oldest and biggest marine park in Terengganu. The Ministry of Agriculture and Fishery Malaysia officially proposed to establish a marine park in Redang Island on 20th July 1990 (Ministry of Agriculture, 1990). The state government declared to designate them as marine parks in 1994 (Talib, 2004; 51). The proposal shows similarity with the Rantau Abang project. It manifests expectations for financial contribution of the petrochemical industry as follows:

A schema could be started to get interested parties such as oil companies to buy back land from private individuals to be given as gift to society to be incorporated into a state park. (Ministry of Agriculture, op cit; 4).

Aiming at rehabilitation of mangroves at the estuary of Kerteh river, the Eco-care project was launched on 16th September 20006. The Malaysian Nature Society and the Optima Group-a petrochemical company, signed a memorandum of understanding in November 2005 to undertake the rehabilitation of mangroves along the river and to establish an

environmental education centre in Kerteh under the coordination of the state government (Malaysian Naturalist vol.60-2; 46). The nature society provides educational contents and ecological knowledge, and the chemical firm financially supports any of their programmes. The project features active mobilization of the local community. For instance, about 60 volunteers participated in tree-planting and river bank cleaning activities on 16th September 2006 (*Ibid.*). Hock Chark Liew, the head of the Malaysian Nature Society Terengganu Branch, also explained the reason that his organization chose Kerteh as the site for its environmental education centre:

That one is because of sponsor. The sponsor is Optima. Because their industry, their people locate in Kerteh, and basically they wanted some environmental project to make them look what they call environmentally aware. You know that the petrochemical have tried to buy “green something” related to environment that help them to buy some images for us. That means good image as corporates. It is because of that they sponsored the centre in Kerteh⁶⁷.

The existence of the project suggests that the district today has become a showcase area of conservancies that obtain preferential financial support from the petrochemical industry.

⁶⁷ Interview with Liew Hock Chark, head of Malaysian Naturalist Society Terengganu Branch, on 3rd February 2009 in Petling Jaya

5.3.2 Fishery administration

Fishermen are the prime users of coastal resources. If fishery administrators had resisted sea turtle conservation because of restriction imposed to coastal fishermen, the project would have been halted. Fortunately, no records of their tough resistance exist. On the contrary, they are active promoters of conservation and play a dominant role to manage sea turtles. This subsection attempts to describe why fishery officers were cooperative with sea turtle conservation. It also mentions that the Department of Fishery was ready to launch a co-management project as far back as the late 1990s.

5.3.2.1 Decline of fishery

Fisheries were once the primary source of employment in the state. However, the presence of fisheries has declined since the 1990s. In 1991, only 9461 persons worked as fishermen in the state according to the Department of Fisheries (Jabatan Perikanan, 1991; 1). At that point in time, fishing contributed only 2.5 per cent and 2.2 per cent of the Gross Domestic Product (GDP) of the country and the state respectively (Josoh, 1991, Jabatan Perikanan, *op.cit.*; 1). The federal government deemed fishing as an unproductive sector to be relinquished gradually (JICA, 1985; section3-4-2, Josoh, *op.cit.*). The criticism against low-productivity of the sector is especially directed towards small scale coastal fisheries that use traditional fishing gears (Josoh, *op. cit.*; 4).

The Department of Fishery Terengganu (hereafter abbreviated as DoFT) decided to

halt the issuance of new fishery licences and direct subsidies for fishermen households in order to reallocate the labour force from coastal fishery to other industries (Jabatan Perikanan Terengganu, *op.cit.*;8-20, Josoh,*op. cit.*; setion4-1).

Further, it is noted that Malaysian coastal fishery has suffered from the severe deterioration of fishery grounds⁶⁸. The critical status holds true to Terengganu in particular. It was documented that coastal fishery activities in the state was deemed to have achieved its maximum level of production relative to resource availability in the early 1990s :

Sumber-sumber perikanan di subsektor laut pantai telah diterokai di tahap maksimum. Dengan ini bermakna bahwa usaha tangkapan, dari segi bilangan bot dan perkakas, dan nelayan tidak boleh ditambah lagi tanpa menjejaskan keadaan sumber. Langkah-langkah tersebut juga memastikan sumber tidak merosot dari kegiatan bot-bot yang sedia ada (Josoh, 1991; section 4-1).

*Sumber ikan laut adalah terhad dan alternatif kepada sumber tersebut perlulah dirancang awal-awal lagi (Jabatan Perikanan, *op.cit.*; 14).*

Easing away from fishing activities requires an additional source of income. In Terengganu, marine tourism plays a significant role to promote additional incomes for fishing communitythe fishing community. Tourism especially bears great importance in Northern Terengganu where few manufacturing industries are located.

⁶⁸ Resource crisis is, as a matter of cause, observed in the west coast of the Peninsular too. In November 2003, 61 fishery officers held a conference putting special emphasis on the North West. The conference deeply concerned excess capacity of fishing in the country and concluded that implementation of comprehensive programmes to reduce fishing capacity was an urgent task (Abu Talib, 2004; 50).

5.3.2.2 Requirement for resource management

Fishery policies, which once aimed to maximize production and technological modernization, nowadays put much greater emphasis on sustainability. Additionally, the notion of responsible fishing emerged in the 1990s and requires serious attention for endangered species.

The concern about fishery resources is not a phenomenon particular in Terengganu or in Malaysia. On the contrary, there is a worldwide concern about the depletion of fishery resources and criticism against marine fishery as the culprit of ecological degradation. For example, statistics of the world Food and Agricultural Organization (hereafter, abbreviated as FAO) in the early 2000s shows that over 70 per cent of fishery grounds are either overfished or are fished to their maximum capacity (the United States Department of Date 2003, p1). Reflecting this concern, several international conferences have been held since the 1990s⁶⁹ to advocate the idea of responsible fishery. The code of conduct for responsible fishing was adopted in the 28th session of the FAO conference on 31 October 1995 (Burns, 2003; 41)⁷⁰. It strongly advised the following:

⁶⁹ FAO compliance agreement in 1993, The United Nations stocks agreement in 1995, and Code of conduct for responsible fisheries and its form associated international plans of action in 1995 are among those.

⁷⁰ Although the code is voluntary, certain parts of it are based on relevant rules of international laws, including those reflected in the 1982 UN convention.

Fisheries should be managed to ensure that fishing and fish processing are conducted in ways that minimize negative impacts on the environment, reduce waste, and preserve the quality of fish caught (FAO, 2001; 5).

To avoid overfishing, the size of the fishing fleet should not be too large for the natural supply of fish. In addition, the effect of fishing gear on the environment should be understood before using a new fishing gear (Ibid.).

Gear should also minimize the catching of fish species that are not wanted or that are not wanted or that are endangered (Ibid.).

Further, the FAO adopted an international plan of action on the management of fishing capacity, which requires member states to reduce and progressively eliminate fishery subsidies contributing to overfishing in 1999 (Martice, 2003). The World Trade Organization ministerial meeting in 2001 held in Doha also admonished the reduction of subsidies. Martice points out as follows:

For the first time, not only traditional trade concerns but also concerns for environmental conservation and sustainable development have played a major role in the launch of trade negotiation (Martice, 2003).

Further, the FAO collaborated with the Convention on International Trade in (hereafter, abbreviated as CITES). At the Reykjavík conference in 2001 and during the 25th meeting of the FAO committee on fisheries held in Johannesburg, FAO-CITES increased their

momentum in pursuing an eco-system approach to fisheries. FAO-CITES strongly requested the signing parties to use selective fishing gears and techniques to avoid catching endangered species such as sea turtles. The Malaysian government has to pay great attention on the by-catch issue as a contracting country of the FAO, CITES and WTO. Under the influence of these international debates, ASEAN countries and the South East Asia Fishery Development Centre (hereafter, abbreviated to SEAFDEC) held the ASEAN/SEAFDEC millennium conference in 2001. The conference declared that ASEAN countries should be the leading players in sustainable tropical fisheries (Vichitlekam, 2004; 19). In this regard, the conference recommended member countries to turning their policy and legal framework into sustainable management. Short-term increase in production lost its legitimacy as the primary goal for fishery policies in the region.

At a national level, the Malaysian Fisheries Department published an action plan for the conservation and sustainable use of fishery resources and biological diversity of Malaysia in 2004 (Department of Fisheries Technical Committee on Biodiversity, 2004). The action plan explicated that sustainability must be a core issue in the national fishery policy:

The main goal as depicted in the policy statement is to conserve Malaysia's biological diversity and to ensure that its components are utilized in a sustainable manner for continued progress and socio-economic development of the nation. Malaysia has a very noble and challenging vision to become a world centre of excellence in conservation, research and

utilization of tropical biological diversity by the year 2020 (Department of Fisheries Technical Committee on Biodiversity, 2004; 7).

In this connection, the action plan criticizes overfishing in the coastal areas as the main culprit of ‘a rapid decline in population of commercial species and increasing occurrence of threatened and endangered species’ (*Ibid*; 15). It criticized bottom trawling in particular, an activity which severely smoothens the seabed, as the primary destructor of fishery resources.

As illustrated above, the principles of the fishery policy shifted from encouraging maximum production, to sustainability. Reducing the fishing capacity is pursued in this regard. Further, the notion of responsible fishing that emerged in the 1990s requires serious attention for endangered species. These trends affect the Malaysian fishery policy. The implication of these trends on sea turtle conservation is, primarily, greater pressure on by-catch. Furthermore, the international trends urge the Malaysian government to reduce coastal fishery activities even more rapidly. Consequentially, the resistance against the regulation of coastal fishery activities, if any, has lost its legitimacy.

5.3.2.3 Expectation for decentralization

The role of the community has also become an important agenda in the fishery policy recently. This sub-part illustrates the factors contributing to the introduction of the policy into the Terengganu fishing sector.

The series of conferences introduced in the previous subpart encouraged community involvement in the management of fishery as well. The FAO initiated the integration of fisheries into coastal management in its third technical guideline for the code of conduct published in 1996. The relevant clauses in the guideline are explored here:

In view of the multiple uses of the coastal area, states should ensure that representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and involved in other activities related to coastal area management planning and development (FAO, 1996; Article 10-1-2)

States should facilitate the adoption of fishing practices to avoid conflict among different fisheries resources users as well as with other users of the marine environment (Ibid; Article 10-1-4)

States should pronounce the creation of public awareness of the need for the protection and management of coastal resources and participation in the management process by those affected (Ibid; Article 10-2-1)

State should establish mechanisms for cooperation and coordination among agencies involved in development, planning and management of the coastal area (Ibid; Article 10-4).

As clauses cited above illustrate, the code strongly expects fishery authorities to establish a mechanism to work with all stakeholders⁷¹ (Ibid; 6).

⁷¹ FAO terms stakeholders as 'those who are recognized by the government as having an interest in the sector' (FAO, 1996; 6).

Decentralization of fishery management was also a core agenda of the ASEAN/SEAFDEC millennium conference in 2001. The conference referred to the transfer of management authority from central authority to the institutions which are physically close to the resource users (Vichitlekam, 2004; 20). Fishery authorities in member countries have attempted five co-management projects with local institutions and resource users since then ⁷²(Chee, 2004; 26). For instance, the Malaysian Department of Fisheries launched a pilot project focusing on trawl fishery covering vessels of 40GRT in Kedah and Perlis (*Ibid*; 27). The department held the first stakeholder consultative workshop between 25th and 26th March 2003 (Talib, 2004; 47), sequentially holding a series of meetings and workshops with stakeholders from then on⁷³ (Chee, *op. cit.*; 27). Reflecting this current trend, the Malaysian action plan for fishery policy published in 2004 emphasised that participation of stakeholder and awareness-raising of local fishers were indispensable for proper resource management (Department of Fisheries Technical Committee on Biodiversity, 2004; 17).

⁷² At the instance of Kuala Lumpur conference held in March 2004, there existed a pilot project as follows (Chee, 2004) :

- a. Trawl fishing in Brunei
- b. Trawl fishing in water in the northwest coast of peninsular Malaysia
- c. Mini purse seines fishery in northern part of central Java sea, Indonesia
- d. Ringnet fishery in Camotes Sea, Philippines
- e. The Tan Giang Lagoon Fishery, Hue province Viet Nam

⁷³ According to Dr. Konishi, an expert in South East Asian Fishery Development Centre, stakeholder involvement in Kedah and Perlis faced with indifference from stakeholders and its status was dormant.

As discussed above, the trend in fishery policy is becoming more inclined toward decentralization. The Department of Fisheries is already familiar with co-management from the late 1990s and the concept became mainstream in their policy in the 2000s. The Ma'derah community-based sanctuary fits this trend very well.

5.3.3 State Government

Needless to say, the state government bears a vital role in sea turtle conservation as the general planner and the regulator. So far, the government has proven its leadership in terms of project coordination. This subpart explains the importance of sea turtles to the state government. It also elaborates on reasons that the Ma'derah project serves as a good pilot project for the state government to experiment on a new method of administration.

5.3.3.1 Revenue from Egg collection license

A motivation for the state government to protect sea turtles is the revenue generated from licensing of egg collection. The State government promulgated the Turtle Enactment in 1951 to control egg collection⁷⁴. Under the enactment, the shoreline of Terengganu was divided into 42 sections for the annual bid. A successful bidder is given the exclusive right to collect eggs layed on the beach that the bidder tendered for (Siow, 1987;2).

⁷⁴ Turtle enactment which has promulgated in 1951 prohibits killing turtles and regulates the collection of turtle eggs. It also has a provision to prohibit cruelty to the animals in general.

Siow(*Ibid.*) reported that the government had generated as much as RM200,000 in revenue for the decade spanning from 1978 to 1987. She further stated that nearly half of the revenue came from beaches around Rantau Abang on which the leatherback turtles nested. As described in the next part of the chapter, the restrictions on collection of leatherback eggs for commercial purposes had been made stringent in 1987. Nevertheless, the state government did not relinquish collecting revenue from eggs of other species. These facts inform us of the following points. The Terengganu government dealt with turtle eggs as a form of fishery resource with economic value. At the same time, the government has been motivated to maintain the population of the reptile so that it would not lose bidders. This partially explains why the government has run hatcheries since the 1970s while it has not completely banned egg collection activities.

5.3.3.2 Marine tourism

Similar to the federal fishery type of administration, the Terengganu state government has also paid great attention to the marine tourism industry to provide for alternative employment of the fishing community in view of the decline of artisan fishery (Universiti Teknologi Malaysia, 2001;19, Unit Perancangan Ekonomi Terengganu, 2001; 52, 2005; 19). It should be noted that tourism in the state once heavily depended on sea turtles. Until the 1980s, the leatherback turtles nesting on Rantau Abang had been the sole

attraction for tourists. The state government, therefore, had a keen interest on its survival.

In this regard, Chan pointed out as follows:

It should be noted that although large nesting population exists in other parts of the world, only the Rantau Abang nesting beaches are easily assessable and hence have the greatest tourist potential. If the turtles are properly managed, Terengganu is assumed of a sustained tourist inflow (Chan, 1987 ; 5).

Marine tourism explains the reason that the state government started protecting green turtles which had been almost ignored until the 1990s. WWF Malaysia made a recommendation to the state government as follows:

Tourists should be encouraged to watch other turtles nest. The fact that these turtles are interesting in their sight should be published. Green, ridley and hawksbill turtles have their own unique way of nesting. Watching these turtles nest can be an enjoyable experience. By populizing the other species as a tourist attraction, Rantau Abang would secure its future as a centre for tourism, should the number of leatherbacks continue to decline (Aikanathan, 1989; 7).

Marine tourism keeps increasing its presence in the local economy, even though turtles play a much smaller role than it used to. Since the establishment of marine parks in the Redang archipelago in the late 1990s, the state has enjoyed its fame as a center of marine tourism in Peninsular Malaysia. Furthermore, eco-tourism and rural tourism started drawing attention of consumers in the 2000s. Malaysia Technology University

(hereinafter abbreviated as UTM) advised the state government to make the best use of the rustic landscape of traditional fishing villages as a unique asset for such forms of tourism (UTM, 2001; section 6-0-67). The state government encouraged a grass-roots level type of environmental education and voluntary beautification of villages (Unit Pelancagan Ekonomi Terengganu, 2001; 41). The project design of Ma' daerah sanctuary mirrors this trend.

5.3.3.3 Community participation in state administration

Small groups organized at a grassroots level have gained importance in state administration. What triggered the movement was the introduction of micro-finance aimed at poverty alleviation in the 1990s. Since the late 1980s, the state government has encouraged small businesses in communities to raise the income of the inhabitants, especially in rural areas (Yayasan Pembangunan Keluarga Terengganu, 1990). Sequentially, the government introduced micro-financing in the late 1990s as the core avenue for poverty alleviation. Following the practices of the Grameen Bank in Bangladesh, the program requested that low-income people form small groups to eventually serve as a platform to launch small businesses. Besides that, the state government has put great emphasis on partnerships with NGOs, the private sector, and the community since the 2000s as explicated in many government publications

(Kementerian Pembangunan Luar Bandar Bahagian Pembasmian Kemiskinan, 1998; 6, Unit Perancangan Ekonomi Terengganu, 2001; 37-41, 2005; 10, 35, 43).

However, there are several points to note. Firstly, the government encourages such partnership for a very practical reason - labour force. Such partnerships would compensate for the lack of manpower and eventually reduce the financial burden of the government. Secondly, the planning role always rests on the government. NGOs, the private sector, and the community are expected to support the ready-made plan rather than joining decision-making. For example, the citation below indicates that the state government expected voluntary offers of manpower from the local community:

Mengadakan aktiviti gotong-royong di antara pihak jabatan kerajaan, NGO dan penduduk setempat bagi usaha membaikpilih dan mempertingkatkan kemudahan dan membersihkan kawasan kawasan setempat yang tercemar. Penumpuan akan diberikan kepada daerah-daerah yang mengalami persisiran pantai yang tercemar seperti di pantai Marang, Kemaman dan Besut di sungai Terengganu di Hulu Terengganu. (Unit Perancangan Ekonomi, 2001; 41).

The government also encouraged dialogues between government officers and villagers (*Ibid*; 28).

As reviewed above, community involvement, government-private partnership, and dialogue were not an exclusive feature of the Ma'daerah sea turtle sanctuary. These concepts were actually concurrent with trend within the state administration.

5.4 Rantau Abang Agreement

The first achievement of cooperation amongst the three parties was the establishment of the Rantau Abang sea turtle sanctuary and the formulation of the sea turtle act in 1988. These were settled during a workshop on sea turtle conservation and management in Malaysia which was held in Tanjong Hara Beach hotel from 14th to 17th December 1987, and funded by ESSO Malaysia. The conference bears great importance because it instituted the turtle conservation strategy which is presently still being adopted in Peninsular Malaysia.

5.4.1 Participants

Here, the participants of the meeting shall be explored. The following Table 5.5 lists the members which include economic planning officers, fishery officers, a tourism officer, representatives of major conservation NGOs, and local academicians. A representative of the petrochemical industry also gave support to the conference. This 1987 meeting served as the mould of sequential meetings to come, and the parties invited for the following meetings have been almost same. Several participants of the first meeting regularly attended the rest of the meetings. The list further suggests a few more points. For example, marine conservation in the state involved various stake holders even at that time. The meeting also paid attention to the interests of industries rather than solely

pursuing the strict protection of wildlife. In other words, the basic concept behind the meeting was not of preservation but based on a utilitarian viewpoint. Lastly, the local government had great presence during the meeting. This means that sea turtle conservation in Terengganu has been co-managed by the government and NGOs alike since then. As such, it is unrealistic to imagine any project free from governmental influence.

Table 5.5: Participants of the Workshop on Sea Turtle Conservation and Management in Malaysia, 1987

Participants

Name	Post and Affiliation
Y.B. Nik Hashim	Terengganu State legal adviser
Mammat bin Abdullah	Deputy Director, Terengganu state economic planning unit
Wan Harujan Sulaiman	Terengganu State economic planning unit
Ahmad Sabki Mahmood	Acting Director, Terengganu State Fishery Department
Abdul Rahmab bin Kassim	Terengganu State Fishery Department
Sukarno Wagiman	Research officer, Terengganu State Fishery Department
Chan Kim Looi	Head, Resource Management and Licensing Unit, Fishery Department, Kuala Lumpur
Siow Kuan Tow	Head, Aquaculture unit, Fisheries developments, Kuala Lumpur
Chan Eng Heng	Lecturer, Universiti Pertanian Malaysia Terengganu
Liew Hock Chark	Lecturer, Universiti Pertanian Malaysia Terengganu
The Yow Pong	Malayan Nature Society
Jane Bennet	National Park and wildlife officer, Sarawak State
Micheal Kavanagh	Director of Conservation strategy project, WWF Malaysia
G. W. H Davidson	Lecturer, Universiti Kebangsaan Malaysia
Abdul Mutalib Awang	Tourist officer, Malaysia tourism development corporation

Observers

Name	Post and Affiliation
Micheal Schwanz	Asia-Pacific Institute for broadcasting development, Kuala Lumpur
Hishemuddin bin Muhammad	Terengganu State Economic Planning Unit

(Source: Economic Planning Unit Terengganu and Department of Fisheries Malaysia, 1987;

Appendix II)

5.4.2 Recommendations from biologist

This discussion focuses on the outcome of the meeting. Firstly, the reports of marine biologists submitted in the meeting are summarised. Siow (*op cit.*; 7-14) pointed out that causes for sea turtle decline include the following reasons:

1. Egg collection

Increase in population and the increase in demand for turtle eggs. The construction of a main road along the beach also facilitated the collection of eggs and transportation to markets near and far.

2. Fishery

Fishing contributes to markets in the main consuming centre. Fishing efforts have increased rapidly with time and have resulted in more turtles being caught accidentally. Furthermore, the introduction of monofilaments and multifilament drift nets has spurred the decline of sea turtle population. Trawling activities introduced in Terengganu in the late 1960s have also killed bottom-dwelling turtle species such as green turtles.

3. Industrial development

Off-shore platforms to exploit and extract crude oil are situated in the migratory path of the leatherback turtles. Being brightly lit at night, these platforms are a distraction to these migratory turtles.

With regard to the third point, Siow recommended as follows:

Elimination of the flare might be a difficult task, but provision of light shields to minimize the lateral transmission of light out of the platform can be done quite easily. PETRONAS and ESSO should be requested to do their best to eliminate possible distraction of migrating turtles (Siow, op cit.; 14).

Benett (1987) expressed concern for serious distraction of nesting and feeding grounds. She pointed out that beach development, offshore development such as oil exploitation, and pollution were the main causes. Benett also noted damage from outboard motors, ingestion of plastic bags and other plastic debris caused the decline in turtle population.

Chan (1987; 6-7) remarked that the main causes are the commercial over-harvesting of eggs, and adult mortalities caught in fishing gear attribute to the decrease. She also proposed to ensure the prohibition of further development of hotels and other public utilities on the nesting beaches at Rantau Abang. She also stressed the importance of public awareness.

As introduced above, these biologists pointed out the various factors causing the decrease in sea turtle population. Various factors such as the loss of habitat, an increase in chemical fibre nets, and plastic bag debris, are linked with the rapid growth of the petrochemical industry in the state. It is clear that hazards stemming from the development of this industry were already foreseen by experts at the time. Having

explored the stance of petrochemical industry, the next point is how the meeting responded to the input from the biologists.

5.4.3 Offer from petrochemical industry

During the opening address of the meeting, Y.B. Abdul Rahshil bin Ngah, the chairman of the Agriculture and Fishery Board of the state, gave the following statement:

Selain dari itu kesan bising dari kerja mencari gali minyak juga mungkin mengakibatkan penyu yang ingin ke pantai negeri ini terbantut dan berpindah ke pantai, negara lain (Rasid, 1987).

Walaupun tidak ada bukti jelas pengaruh ini, tetapi kesan kekurangan penyu begitu ketara sejak laut Terengganu mula digerudi mencari minyak (Ibid.).

This criticism against the petrochemical industry, however, was followed by a surprising announcement that ESSO would cover the costs of awareness-raising programmes for the local community. Abdul Rahshil declared the following statement:

Selain dari usaha pemuliharaan secara langsung, tumpuan pendidikan sivik kepada pengunjung atau penduduk setempat juga dilaksanakan. Dengan kerjasama pihak ESSO production Ini (EDMI), Jabatan Perikanan dan UPM, beberapa risalah menerangkan peraturan dan pantang larang semasa melihat penyu telah diedarkan kepada orang ramai. Sebuah pusat penerangan penyu yang berharap RM300, 000 juga telah siap dibina bagi tujuan yang sama. Bagi murid-murid sekolah pula perancangan sedang dibuat bagi memberi ceramah sivik di kalangan murid-murid ini terutamanya di kalangan murid-murid yang tinggal di kawasan pantai (Ibid.).

Accordingly, E.L Smith, the president of ESSO Malaysia explained the stance of the petrochemical industry in his speech as shown in the following excerpt below.

We are pleased to hear that there are plans to convert part of Ranatau Abang into a turtle sanctuary. We are also pleased to hear that the Terengganu state Government has set aside an allocation for the construction of a turtle laboratory with research and hatching facilities in Rantau Abang. A well-policied sanctuary will prevent the public from abusing the turtles, like disturbing those laying eggs (Smith, 1987).

We in Esso take our responsibility to marine life seriously because we want this natural heritatge to last. To ensure that ESSO operation leave it unharmed, we sponsored a study for the conservation of marine life. Oil spill control courses and drills are held periodically to prepare participants on what to do in the event of a spill so that the marine environment will remain intact. Esso sponsored ecological studies. The publication of a booklet on environmental education for secondary schools in Malaysia, a diorama on the leatherback turtles of Terengganu for display at the museum and research on the breeding habits of cuttle fish sound off the island of Pulau Kapas. Marine life conservation will always be high on our priority list. We firmly believe that all ESSO operations can go hand-in-hand with a clean and healthy environment (Ibid.).

The offer was unanimously accepted on the meeting, and this speech criticised the direction of sea turtle conservation strategy in the state. Mitigation of “public abuse” was determined to be the crux of sea turtle conservation. To educate the local community, school children and visitors became the main avenue for conservation, even though details of the educational programme were not yet settled then. As a result, financial contribution

of the petrochemical industry was confirmed, whilst the operations of the petrochemical cluster were secured.

5.4.4 Consequences

The outcome of the meeting is further reviewed in this subsection. The participants agreed to establish regulation as follows (Economic Planning Unit Terengganu and Department of Fisheries Malaysia, 1987; 3):

- a. Complete ban on the collection, sale, transportation, handling and keeping the eggs of the leatherback turtle, except for hatchery and scientific purposes.
- b. Ban on all aspects of commercial marketing of turtles or their parts and products.
- c. The Department of Fisheries will buy back 100 percent of eggs collected and replanting them in the Rantau Abang hatcheries.

In regards to concern on land development at the Rantau Abang beach, the recommendations below were made (*Ibid*; 12):

- a. No further land from within the designated sanctuary area should be alienated for any purpose whatsoever.

- b. Further development on adjacent alienated land should be strictly controlled in line with the objective of the turtle sanctuary.
- c. The sanctuary committee should be recommended to bear in mind a long-term goal of relocating all businesses that are currently on the seaward side of the ditch to the landward side.
- d. Beach lighting should be regulated and controlled, and there should be a setback line for buildings in both the alienated and government land.

The participants also adopted recommendations for restricting fishing operations as follows (*Ibid*; p17):

- a. Very long Thai Style drift nets should be prohibited off Terengganu
- b. There should be a restricted fishing zone off the sanctuary during the nesting season, within which drift nets and trawling would be prohibited. This zone will lie parallel to the coast from Kampong Pasir Putih in the north to Tanjong Jara in the south. On the landward side, its boundary would follow the seashore, to the north and south of the sanctuary, and the sanctuary boundary itself elsewhere.
- c. On the seaward side, the zone would extend to 10 nautical miles offshore.

Provisions should be made for the extension of the restricted fishing zone if research indicated a more extensive area.

In addition, the participants also recommended to ‘educate’ local people (Economic Planning Unit Terengganu and Department of Fisheries Malaysia, op. cit.; 22). The education refers to the provision of biological knowledge in view of mobilizing the local community and infusing in them an affinity towards wildlife.

The consequence of the meeting can be summarised as follows: First, the petrochemical industry obtained dominant influence on sea turtle conservation as the main sponsor. Second, activities of the industry were not restricted enough. The construction of new large-scale chemical plants was not regulated even though Barnett manifested her concern. Pollution control was left to voluntary efforts of the industry. Third, small-scale coastal fishermen became the focal point of conservation programmes. Fishin gear such as ‘*pukat pari*’ was banned and egg consumption was discouraged. Here, fishermen were chosen to be the core target of enlightenment. Fourth, the green turtle was overlooked, whilst serious actions to protect leatherback turtles were focused on.

5.5 Ma'daerah – new model of conservation

In the previous section, this study reviewed the framework of sea turtle conservation in Terengganu state settled through the 1987 meeting at Rantau Abang. With

those findings in mind, this section examines the Ma'dareah sea turtle sanctuary project.

The main topics here are community, education, and land development. This subpart will

first of all review the discussion about the role of the community in sea turtle conservation.

It shows that the Ma'daerah project mirrors recent debates in the region, yet at the same

time it is not detached from the discussion held in the 1987 meeting. Accordingly, it

addresses the Ma'daerah project in the context of land development in Southern

Terengganu. It reveals that the actual role of Ma'daerah very symbolic. Through these

debates, this subpart will denote the objectives of this project.

5.5.1 Stake holders and Steering Committee

The sanctuary serves as a symbol of commitment of the petrochemical industry to conservation. Its managing body mirrors this feature of the sanctuary.

The Ma'daerah working committee comprising the Department of Fisheries Malaysia, BP Asia Pacific Malaysia Sdn Bhd, BP PETRONAS Acetyls Sdn Bhd, WWF Malaysia and DOW Chemical Malaysia Sdn Bhd was established in 1999. This committee has and will continue to meet periodically to develop, implement, monitor and evaluate all conservation and management programmes at Ma'daerah and present development plans to the Steering Committee for development.

Ma'daerah Turtle Sanctuary Steering Committee was established in 1999 to facilitate the overall management of the conservation and management programmes at Ma'daerah. This committee also facilitates stakeholder consultation and serves as a platform to address conservation issues and identify practical solutions. The committee has

and will meet at least once a year and comprises the following members/stakeholders⁷⁵.

Ma'daerah sea turtle sanctuary, which manifests itself to be a community-based conservation project, was established in 1991.

According to Kammarudin Ibrahim, Head of the Turtle and Marine Ecosystem Centre, WWF Malaysia and BP took initiatives in its establishment:

Actually because Ma'daerah is in Terengganu and Terengganu has a system for managing turtles through what we call Terengganu Turtle Sanctuary Council. Chairman of the council is the Chief Secretary. He is from administrative office of the state. The others include fisheries department, other government agencies plus NGOs. One of the NGOs is WWF. We work under the council. The idea came actually during the meeting of the council. WWF is more focusing their works on community so we let them to go ahead but we work together. Let's say other NGO like BP as well⁷⁶. There was a lady called Norani, Puan Norani. She worked for BP and a member of the council. The idea came from the council⁷⁷.

For WWF Malaysia, the establishment of the sanctuary was a part of an international campaign to save sea turtles. Lau Min Min, a WWF officer who had launched the project stated the following:

⁷⁵ Ma'daerah turtle sanctuary, <http://madaerah-turtle-sanctuary.org/about-us>. Accessed 3rd/ March/ 2007

⁷⁶ This statement of Kammarudin indicates an interesting localised terminology. BP, an oil major, is a gigantic profit-making company and not considered to be an NGO in Western terminology. However, in this context, "NGO" literally refers to "Non-Governmental".

⁷⁷ Interview with Kamaruddin Ibrahim, the Head of Turtle and Marine Ecology Centre at Rantau Abang on 1st February 2009.

WWF is conducting monitoring elsewhere. The primary programme in Malaysia was the leatherback programme because it was a big issue. It is a very charismatic creature of the sea. The leatherback programme was also a part of the WWF global programme; it is not only a WWF Malaysia program but a worldwide one. WWF is a global organization. So I think it is one of the reasons why after that more other projects have started⁷⁸.

For BP, contribution to this project was a good opportunity to promote an eco-friendly image of the industry. Kerteh, their stronghold, is regarded as the most suitable site for implementing programmes. Kamaruddin and Lau respectively mentioned as below :

The reason is that BP is one of the companies in Kerteh industrial area. BP has something like conservation program as well. It was something like green programme or something dealing with all environmental issues. That is why Puan Norani who was in committee activated it. That is why we choose the place. It is not so far from the industrial area. BP at that time said that they have industry; a developed industry there; so they are responsible. They should contribute. This contribution is funding and something else for community-based in Ma'daerah⁷⁹.

The reason why they choose the area was actually that the place is close to the industrial area and they have their own environmental program⁸⁰.

I think we had different priorities. WWF was there for turtles. BP also came there to conserve but they also want promote BP's image, off cause clean image of BP, you know. The oil and gas industry always need clean and green image⁸¹.

⁷⁸ Interview with Lau Min Min, former project manager of Ma'daerah Sea turtle sanctuary Project of WWF on 17th January in Alor Gajah, Malacca.

⁷⁹ Interview with Kamaruddin Ibrahim, the Head of Turtle and Marine Ecology Centre at Rantau Abang on 1st February 2009.

⁸⁰ Interview with Lau Min Min, former project manager of Ma'daerah Sea turtle sanctuary Project of WWF on 17th January in Alor Gajah, Malacca.

⁸¹ Interview with Lau Min Min, former project manager of Ma'daerah Sea turtle sanctuary Project of WWF on 17th January in Alor Gajah, Malacca.

The Department of Fisheries also welcomed BP's proposal. Abdullah Khasim, an officer of the Department of Fisheries Terengganu who had been in charge of sea turtle conservation for more than 20 years, explained the merit of the three party partnership as follows:

As far as conservation goes, we didn't have expertise even in the department, even in the state government but in the WWF⁸².

As well as cooperation with state government, we also cooperate with WWF because they had connection with international community. We appreciate effort of advises of their own in this matter as well as to have expertise like their marine biologists that helped us. Actually we are working quite well on this matter. We joined WWF projects; we have special projects; joint effort projects for example, Ma'dareah sea turtle sanctuary. We have the joint effort among Department of Fisheries, state government, WWF, as well as a corporative company, BP, the British Petroleum. So this is the example of the joint effort to work together. We work together; many parties should join the effort; join the expertise; manpower, and money as well to do the total conservation of the sea turtles⁸³.

The three main parties have different kinds of resources. The Department of Fisheries has the authority to manage nesting beaches and manpower, the WWF has expertise and international connections, and BP has the money. Lau stressed the significance of this division of roles as follows:

Basically, each partner has a role. The role of the Department of Fisheries as the authority of turtle is to manage the beach and to find contract workers, and to monitor the nesting. They also manage the hatchery.

⁸² Interview with Abdullah Khasim, Department of Fisheries Terengganu, January 2008 in Chendareng; Terengganu.

⁸³ Interview with Abdullah Khasim, Department of Fisheries Terengganu, January 2008 in Chendareng; Terengganu.

They also equip goods in the hatchery. They conduct tagging programme. Our role was to come up with the sustainable way of three-party partnership. So a joint committee is setting up to decide programmes. We decided to we can have programmes that will bring it money because we worried about the financial situation of Ma'daerah⁸⁴.

Up to here, the study looks back how the project was launched. This discussion shall proceed accordingly to how WWF organised MEKAR, the community group. Key informants told us that WWF had recruited the members making the best use of existing local organizations such as the Fishermen Association and Teachers' Association. Amran Salleh, head of the MEKAR group, explained how the WWF approached him and how he organized local villagers - depicted as follows:

Pada awalnya, WWF datang jumpa saya untuk kumpul beberapa orang untuk menubuhkan sebuah jawatankuasa, menubuhkan satu persatuan yang belum ada nama bagi berkerja pemuliharaan penyu. WWF, Cik Rahayu datang bersama dengan beberapa orang kawan dia. Dia mahu penduduk asal di tempat ini bagi menpengurusikan persatuan ini. Kami dijumpa ramai-ramai lebih kurang 40 orang dan bersetuju untuk menubuhkan satu persatuan yang kemudiannya dia beri nama MEKAR, yang itu Persatuan Khazanah Rakyat Ma'daerah⁸⁵.

Kita mengadakan perjumpaan. Dengan nelayan lebih ramai akan juga dengan orang kampung. Kerana group mula-mula itu, dia daripada komuniti masyarakat jadi mudah kita mengumpul orang kampung dan nelayan-nelayan untuk membuat perjumpaan. Aktiviti pertama yang MEKAR buat ialah perjumpaan hari raya. Kita makan makan dan bercakap. Mudah untuk menarik

⁸⁴ Interview with Lau Min Min, former project manager of Ma'daerah Sea turtle sanctuary Project of WWF on 17th January in Alor Gajah, Malacca.

⁸⁵ Interview with Amran Salleh, head master of Kerteh elementary school and chief of persatuan Ma'daerah Khazanah Rakyat, August 2007, at Kerteh elementary school.

orang itu datang mula-mula ini. Kita cerita pasar persatuan ini. Kemudian ini bernama MEKAR. Jadi, mereka dengar dan mereka berminat. Kemudian itu, kita lankah seterusnya kita buat road-show yang mana kita pameran gambar-gambar, kita panggil Jabatan Perikanan untuk memberi ceramah jadi ini menambahkan lagi pengetahuan masyarakat tentang tujuan persatuan MEKAR ditubuhkan⁸⁶ .

This study reviews the launch of the Ma'daerah sanctuary managing body up to here. It is observed that transaction cost in organizing the managing body was small owing to the existence of the Terengganu sea turtle management committee, Fishermen's Association, and Teachers' Association.

5.5.2 Project description

Ma'daerah is the second sanctuary established in Terengganu. It is a cove with a 1.7 km sandy shoreline located within the Paka-Kertih rookery, flanked by the Paka River and the Kertih River (Department of Fisheries Malaysia, WWF-Malaysia, and BP Malaysia 2004, *pp* 8-9). Nesting numbers of sea turtles on Ma'daerah beach does not necessarily entail a great portion in the state. The sanctuary accounts for only about 7 per cent of state nesting numbers with only 2 leatherback turtles since its opening in 1999. The fact that the sanctuary is located near the large Kerteh petrochemical complex has had a significant impact on the sanctuary. The Paka-Kerteh rookery has seen a rapid change in the environment since offshore oil exploration started in 1979. In spite of this

⁸⁶ Interview with Amran Salleh, head master of Kerteh elementary school and chief of persatuan Ma'daerah KhazanahRakyat, August 2007, at Kerteh elementary school.

dramatic change, the cove has been kept untouched because a series of low hills, especially the steep Labohan hill, is concealed there. The dense vegetation and natural forest of the mounds has also shielded the beach from the lights of the industry and the coastal highway. The only road access is a steep trail cutting through secondary forest. As a result of this isolation, even inhabitants of nearby villages rarely visit the beach. This sanctuary has eventually come to hold a symbolic role as the last haven of the endangered reptile within the heavily industrialized district.

Involvement of the local community highlights another feature of the project. It is one of the earliest conservation projects in Malaysia which aim to pursue community involvement⁸⁷. Various activities to emphasize environmental education and awareness among local community are practiced. The excerpts below introduce the on-going programmes described in a PR leaflet (Department of Fisheries Malaysia, WWF-Malaysia, and BP Malaysia, *op. cit*; 10-14).

Kids' camp

It offers school children and community groups the opportunities to learn about turtle conservation work while assisting the Madaerah staff on projects.

⁸⁷ Although few conservation projects have manifested itself as a community-based project in Malaysia, it is noteworthy that community involvement has been practiced under name of social forestry in Borneo. Similar projects can be seen in the southern part of the island, Indonesian territory, too. This experience has great potential to enhance community involvement in the countries.

Community Organization

It organizes a volunteer among local habitants serving as information sources and working with the authorities on specific conservation actions and projects.

The jambori alam skitar

This is a 3 days event for community awareness, sponsored local kids to learn about hatchery activities, mangroves and nesting turtles with assistance from Department of Fisheries, department of forest and BP.

Distribution of Educational materials

Conservation resource materials, such as fact sheets, brochures, modules and videos, on turtle conservation are being developed to distribute to community and educational groups. Media campaigns also use these materials to highlight certain issues and actions required.

Teacher training course

In conjunction with the Ministry of Education, the course is a part of a future programme that seeks to integrate turtle conservation activities as a

component of teacher training colleges to promote a turtle conservation curriculum in Terengganu.

The weekend with turtles programme

It caters to families and groups who can only spare weekend time to volunteer for conservation work at Ma'daerah. It is a learning program in an outdoor setting.

Annual beach cleanup

Since the beginning of Ma'daerah in 1999, the Paka-kertih community has organized an annual beach clean-up event that attracts people from surrounding villages, local agencies and local petrochemical companies. Up to 150 volunteers picked up rubbish from the beach and the municipal council provided personnel and equipment to properly dispose the waste.

Tree planting

In conjunction with beach clean-ups, the Ma'daerah working group committee initiated tree planting activities to supplement beach vegetation for marine turtles.

As described above, it is clear that the core interest of the project is education. It primarily targets children and youngsters for the sake of long term sustainability. Fishermen are also regarded as an important target for awareness campaign in order to ameliorate the by-catch problem and hopefully to curb turtle egg consumption. In addition, the significance of approaching fishermen is that they are the core members of the community. The fishermen had lived in Kerteh before the petrochemical complex and the sanctuary were set up.

5.5.3 Community-involvement

The chapter proceeds to the central concern of the study. As reviewed in Chapter 3, community-based conservation programmes try to nurture initiatives of the local community so that local community would voluntarily manage the protected areas in future. To achieve this goal, previous studies encouraged horizontal partnership between the managing side and local inhabitants. They also encouraged the interactive communication between managers and the local community. Here emerge a few questions: How do managers actually refer to community-based conservation? Next, how do they implement a dialogue session? Finally, how do the fishermen react?

Abd Halim Mat Noor, who had often implemented dialogue sessions in the field, described what actually happened in sessions in the excerpt below:

Almost issue at sessions is about the net we banned before, actually, pukat pari. Pukat pari is the one of the issues there. So when we discuss in the dialogue with the local people from there, most fishermen from there take note. When somebody put the net into the sea, guys; I mean local people from there; call us to make enforcement from here. That is good. I think, now collaboration combination of local people and Department of Fisheries for this effort is good⁸⁸.

From the fishermen, they have few groups like big boats (owners' group) and fiber boats, and small boats. The opinion from small boat fishermen there was just where pukat pari are, where it is. They gave us location of the net in the sea⁸⁹.

These remarks tell us that the managing parties, especially the Department of Fisheries, take the session as an opportunity to penetrate the existing policy and facilitate their enforcement. In the Ma'daerah sea turtle sanctuary project, the main channel for such kinds of communication are sessions called "dialogue with fishermen". However, it is questionable as to whether these sessions pave the path for dialogue literally. Informants having attended dialogue sessions further describe how fishermen behaved at sessions:

They wouldn't say to me, they just say "I don't want conserve". They will just say "Yeah, yeah, yeah, yeah!" But still they don't do. It is very difficult⁹⁰.

Kalau ini projet, sekadar untuk mendapat apa kata orang menambah bilangan penyu ataupun projek menambahkan, membesarkan pusat santuari

⁸⁸ Interview with Abd Halim Mat Noor, Chief Renger of Ma'daerah sanctuary on 9th July, 2007 in Rantau Abang.

⁸⁹ Interview with Abd Halim Mat Noor, Chief Renger of Ma'daerah sanctuary, on 9th July, 2007 in Rantau Abang.

⁹⁰ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary project on 26th, August, 2007

*penyu, tidak ada sebab kita nak memproteskah, memkomenkah, melebihi sesiapa tidak ada*⁹¹.

*Biasanya mereka tanya tentang perkuasaan, undang-undang. Itu dijawab oleh pegawai perikanan sebab MEKAR hanya kepada sedar, kesedaran mengapa mereka perlu bekerjasama membantu kita*⁹².

Judging from these remarks, the sessions have no function in decision-making. Moreover, little interaction between the managing parties and fishermen occurred at the sessions. Informants also mentioned that only about half of the fishermen attended the session and, to make the matter worse, even fewer fishermen are interested in such conservation activities (see excerpt below).

*We called for fishermen to discuss about fishing gears they use. Specifically, we discussed about use of pukat pari they catch sting rays. These are illegal because they by-catch turtles. The thing is that only the good fishermen came, the bad fishermen using pukat pari don't want to come. It did go hard to reach them*⁹³.

Dahulu banyak malibakan, setahu saya, Paka, Kerteh, Kemasik dan juga ahli-ahli jawatankuasa itu sendiri. Peringat awal begitu ramai, banyak.

*Sekarang ini saya nampak tambah berkurangan - yang tinggal hanya guru-guru. Guru-guru sahaja*⁹⁴.

⁹¹ Interview with Ramlee bin Abdullah, head of Fishermen Association of Kerteh and Kemashik, on 26th December 2007 in Kampung Tengah, Kerteh.

⁹² Interview with Amran Salleh, Head of Ma'derah Khaznah Kita (MEKAR) group and principal of Kerteh Secondary School, on 27th July 2007, in Kerteh.

⁹³ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary project on 26th, August, 2007

⁹⁴ Interview with Ramlee bin Abdullah, Head of Fishermen association in Kerteh and Kemaman on 26th December

*Peringkat awal ramai nelayan seperti kami, seperti pak cik dan kawan-kawan tolong, sekarang saya tak mahu, saya nampak kumpulan-kumpulan termasuk saya sendiri sudah tarik diri*⁹⁵.

The central concern of the study emerges here. How do fishermen consider conservation? What lies behind their silence at dialogue sessions? What prevents them from active participation? Chapter 6 tries to reveal these questions systematically.

5.5.4 Perception toward fishermen

The perception of the programme managers towards the local fishermen is explored in this subsection. Two programme officers of WWF Malaysia share a negative perspective on the local fishing community. They assume that fishermen would adhere with *pukat pari* and egg collection because of insufficient education as well as poverty:

*Conservation is alien idea for them because of lack of understanding science overall. I think one of the reasons is the educational level of the community members. Science is not something which they can rely on. They care what they call culture. It is not a culture. They just trust the information passed down from generation to generation. It is very hard to make them change, especially adult*⁹⁶.

Even though we use science to make them understand that it is not sustainable, that it doesn't have magical nutrition, they shouldn't profit from it,

2007.

⁹⁵ Interview with Ramlee bin Abdullah, Head of Fishermen association in Kerteh and Kemaman on 26th December 2007.

⁹⁶ Interview with Lau Min Min, former project manager of Ma'derah Sea turtle sanctuary Project of WWF on 17th January in Alor Gajah, Malacca.

they don't believe these idea. They don't believe they will lose turtles because there are many eggs. They don't approve that in future the turtles would not be there anymore. They do not understand the concept. (Theirs are) day to day food approach⁹⁷.

The fishermen immediate need, actually, foods on the table. Conservation is out of their priorities. So conservation is really difficult. I find it very difficult to teach them to change their mind-set. If only they would see more in long term, they would be able to change their attitude. I know fishermen; my partners are many fishermen. They remain their old style; they remain unwilling to change their style, their way. They must be as supposed to be. Also making a balance is difficult. I understand that they are poor people and that is the way of getting money but, at the same, I have turtle supporters. I have to balance both of them. It is very difficult⁹⁸.

The remarks present us that Ma'daerah project is designed in line with a stereotype image of rural villages in the Third World.

An important point to be examined here is whether poverty is really rampant in the region. As discussed in previous chapters, poverty is the main threat for conservation in the developing world. Considering that Terengganu fishermen were once famous for their poverty issues, this topic deserves special attention. For instance, Josoh depicted that over 70 per cent of fishermen in the state were under the poverty line in the 1970s (Josoh, 1991; 24).

The poverty profile for the state of Terengganu shall be examined. As Table 5.6

⁹⁷ Interview with Lau Min Min, former project manager of Ma'daerah Sea turtle sanctuary Project of WWF on 17th January in Alor Gajah, Malacca.

⁹⁸ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary project on 26th, August, 2007

shows, the number of households under poverty relief programmes in the Kemaman district is relatively small, compared with its northern counterparts. Further, the economic planning unit of Terengganu (Unit perancangan Ekonomi Negeri Terengganu, 2005; 27) revealed that fishermen correspond to only 3 per cent of the households under the poverty line in the state. 50.8 per cent of poverty households comprised of either handicapped, ailing, or retired people. Judging from the geographic distribution and poverty profile by sector, it is suggested that poverty does not linger amongst fishermen in the Kemaman district any more.

Table 5.6: Number of Households under Poverty Relief programmes in Terengganu State in 1998

	Program Pembangunan Rakyat Termiskin	Hasil Semakan Terakhir /Amanah Ikhtiar Malaysia
Northern Terengganu		
Besut	1760	639
Setiu	820	384
Central Terengganu		
Kuala Terengganu	3030	1615
Marang	1228	392
Southern Terengganu		
Dungun	513	156
Kemaman	457	137
Internal region		
Hulu Terengganu	826	n.a.

(Source: Kementerian Pembangunan Luar Bandar, 1998)

On the contrary, some fishermen in the district enjoy opportunities for additional income through part-time jobs at the petrochemical clusters. Some have even greatly gained

financial assets from land especially since the construction boom in the 1980s⁹⁹. With this in mind, the author concluded that restrictions on particular gear or egg consumption are unlikely to drive villagers into starvation.

5.6 Unsettled issues

In Chapter 4, documents revealed that several inconsistencies amongst the managing parties remained unsettled although their partnership lasted more than two decades since the late 1980s. Key informant interviews show similar inconsistencies amongst them. This subsection deals with the egg collection license, land development, and eco-tourism.

Here arises the core interest of the research: Do fishermen accept conservation effort? How do they view the project? What are the motivating factors for them to protect turtles? The WWF emphasised on the challenging nature of the project because they considered that “conservation is a totally alien idea for the local fishermen”¹⁰⁰.

5.6.1 Egg collection License

As previous chapters of this study have shown, the Terengganu state government only banned the collection of eggs of the leatherback turtle whilst WWF Malaysia requesting for a total ban of the egg collection of any kind of turtles. Rahayu clarified

⁹⁹ This remark is based on the author's own field study conducted in 2007. Concerning fishermen's speculation to land, the main source of information is Ramlee bin Abdullah, the head of Fishermen's Association of Kerteh and Kemashik.

¹⁰⁰ Ma'derah turtle sanctuary (n. d.) <http://madaerah-turtle-sanctuary.org/about-us>, Accessed 3rd March 2007

their position as below:

Definitely, off cause, we want to conserve all the turtles. Maybe it can be a little bit too harsh. We appreciate complete ban of selling turtle eggs. The problem that currently only leatherback eggs are banned. Other species you can consume, it is a big problem¹⁰¹.

WWF Malaysia also has a vision to use community organisations as a platform for lobbying to the state government. Rahayu disclosed as follows:

What we are trying to do is to lobby the state government together with MEKAR, the community group, to amend the law. We lobby Mentri Besar, the chief minister of the state, to change the law to ban all species. We respect all species¹⁰².

On the other hand, government officers commonly supported the license system as it is a very efficient way to manage nesting beaches. Abdullah and Kammarudin stated the following:

There are only very few beaches that we don't find economic (value), which has only one or two nests. The fishery department does not protect these beaches where we still issue license to the egg collectors. Yet we don't mean to let them sell to the market. Actually, we offer the fishermen price higher than local markets for them to sell eggs to us. These licenses, egg collectors, actually help government to protect and collect eggs for conservation. That is why we still use this license. It is not profitable for the

¹⁰¹Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

¹⁰² Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

government to pay to a worker RM800 per month to collect an egg. It is better for us not to pay anything to the egg collectors but to buy back all the eggs for us. If there were no licence, maybe everybody would go to the beach and collect eggs. It creates social problem. Maybe the local people are fighting each other on the beach¹⁰³.

The reason is manpower. We don't have many staffs; we have limited funding, so we can't control all the beaches. We indicated good beaches. Only important beaches like Ma'daerah, Gliga, Pulau Redang, we are protecting. For those beaches we don't offer people bit to collect eggs. This is the way we protect eggs. Also, if we have some money, we buy eggs from local people who collect eggs from other beaches. That is the way of protecting eggs¹⁰⁴.

Liew basically supported the license system, yet he pointed out it does not work well due to the lack of funding, as he states below:

The government can't afford to hire people to go and collect it, so more or less need to privatize, that means giving licenses to certain individuals to go and patrol beaches to collect eggs and then have them back the eggs. Idea of this is good provided the government is able to buy back all the eggs. If it can buy back all the eggs, it is fine but it is costly. While the government believes they have all the money to buy up, quite often they found it the government actually had very limited funding. The dilemma here is that, no doubt, the government tries to introduce the system where all the eggs can be collected and hatched in their hatcheries, but they find that if they can't come up with funding to buy all the eggs while fixed price of eggs is increasing, 5RM per egg now. Then the number of eggs they buy reduces while the budget is same. Perhaps, they will say "OK, now we are selecting." It is the way they are losing control¹⁰⁵.

¹⁰³ Interview with Abdullah Khasim, Department of Fisheries Terengganu, January 2008 in Chendareng; Terengganu.

¹⁰⁴ Interview with Kamaruddin Ibrahim, the Head of Turtle and Marine Ecology Centre at Rantau Abang on 1st February 2009

¹⁰⁵ Interview with Mr Liew Hock Chark, head of Malaysian Naturalist Society Terengganu Branch, on 3rd February 2009 in Petling Jaya

The stance towards the turtle egg license system in Malaysia also depends on whether one considers sea turtle eggs as a type of fishery resource, or not. Efficient management is the core concern for a utilitarian, whilst turtle egg collection in itself is unacceptable for the preservationist.

Liew further emphasised the necessity for proper resource management as a utilitarian:

It is a resource provided if you don't whole population waste. There must be a highest point of harvesting resource; it must recover more than we take. If you want it to be a resource, it has to be sustainable. You must allow endangered population recover till the point where harvesting would not harm it. If turtle population hopefully grow up its numbers till the point harvesting would not harm it, Ok, you can start, take it. Take it.¹⁰⁶

On the other hand, Rahayu manifested preservationist stance:

Basically turtle is, actually, a precious species. Turtles have been around since dinosaur's stage of the earth. It has survived millions of years, more than hundred million years. But now, in our generation, in the past thirty years, the number is going down tremendously¹⁰⁷.

I think this is an affair of administration, I mean, of the license system of Malaysia before turtles were not under the Ministry of Natural Resources... no, under the Department of Fisheries. They should not perceive turtles as resources. They should perceive turtles something that you

¹⁰⁶ Interview with Mr Liew Hock Chark, head of Malaysian Naturalist Society Terengganu Branch, on 3rd February 2009 in Petling Jaya

¹⁰⁷ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

*should protect, not to exploit. Certainly, they still consider it as a resource*¹⁰⁸.

As reviewed, there still exists a difference in viewpoints between the Department of Fisheries and the WWF, as the existing policy condones egg collection, reflecting the former's view point. Further, the key informant interview revealed the latent discordance between the two major conservation NGOs.

5.6.2 Land development and Ma'daerah project

This discussion shall sequentially proceed to examine land development. The debate here is closely linked with the first part of the chapter. The crucial difference between the Ma'daerah project and the Rantau Abang project is location. Ma'daerah is located at the heart of the Southern Terengganu petrochemical corridor whilst Rantau Abang is a much less developed, and less densely populated village.

The heavy industrial area had already existed when the project was launched in 2001. The sanctuary exists as if it were cast away within the petrochemical complex. A question that comes to mind here is whether preserving only a 1.7 km length of beach is effective to mitigate the decline of sea turtles. Table 5.7a shows the average bids for the right to collect eggs on the beaches in Terengganu from 1978 to 1981. It is estimated that

¹⁰⁸ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

the rates were roughly proportional to the income the bidders could earn (PETRONAS and ESSO Malaysia, 1981; 97).

Table5.7a: Average Price of Successful Bids of Sea Turtle Egg Collection Licence in Terengganu from 1978-1981

Ketapang	30677
Ranatau Dalam	25477
Rhu Kabur	16138
Pantai Kijal	10415
Jambu Bangkok	6500
Gliga	5563
Tanjung Batu	3919
Cakar Hutan	3308
Ma'daerah	3251

Unit: Malaysian Ringit

(Souce: Drawn by the author based on Petronas and Esso production in Malaysia, 1981)

Table5.7b: Average price of successful Bids of Sea Turtle Egg Collection Licence in Paka-Kerteh Rookery in Terengganu from 1978-1981

Pantai Kerteh	1378
Chakar Hutan	3308
Ma'daerah	3251
Tanjung Batu	3919
Rhu Kudung	1833
Kubun Paka Syar	406
Kuala Paka	220

Unit: Malaysian Ringit

(Souce: Drawn by the author based on Petronas and Esso production in Malaysia, 1981)

The beaches around Rantau Abang had special economic significance because leatherback turtles only nested at these beaches. On the other hand, the prices of the beaches where only the green turtles would nest strongly correlated with nesting numbers. Clearly, Ma'daerah was not an outstanding beach compared to the others. Table 5 further depicts the bids of beaches in the Paka-Keteh rookery. It also reveals the mediocre status

of Ma'daerah. Nevertheless, an important fact one must be reminded of is that all the beaches listed in Table 5.5b, except for Ma'daerah, have been lost in the course of land development since the 1980s. Key informants commonly pointed out how drastically coastal development deprived turtles of their nesting grounds:

I think, of cause the development of the beach, the natural nesting grounds causes decline. In Terengganu we develop a lot of beach areas originally used by turtles. If you see the beaches between Paka and Kerteh, it is clear. Actually the beaches are traditional nesting beaches for turtles, but since 1980s a lot of development has occurred and lessen the nesting area¹⁰⁹.

I can give the example of Paka-Kerteh. When I started to my works in Paka-Kerteh area in 1990, there were many turtles on beaches like Rhu Kudong, Chagar hutan... Earlier on, there was no petrochemical industry so turtles used to have many beaches¹¹⁰.

Long time ago, say 1980s and 2000s you can compare. I think during that time we had more than 500 nests per year, if I am not mistaken. Now, because of development of these two areas (Paka and Kerteh), it is hard to find 20 nests a year¹¹¹.

Rahayu Zulkifli, WWF program officer taking charge of Ma'daerah sanctuary, also mentioned as follows:

All sort of development goes without thinking about conservation. They don't really think about what effect the PETRONAS gave. They

¹⁰⁹ Interview with Abdullah Khasim, Department of Fisheries Terengganu, January 2008 in Chendareng; Terengganu.

¹¹⁰ Interview with Kamaruddin Ibrahim, the Head of Turtle and Marine Ecology Centre at Rantau Abang on 1st February 2009.

¹¹¹ Interview with Kamaruddin Ibrahim, the Head of Turtle and Marine Ecology Centre at Rantau Abang on 1st February 2009.

destroyed nesting beaches but there is nothing we can do. Lights! Lights there are very bright like a Christmas tree. The lights are too bright. Its reflection falls on Ma'daerah beaches. We release hatchlings but the hatchlings are attracted to that light. Also the beach is too bright; actually turtles don't go see when a night is bright¹¹².

Judging from the information above, Ma'daerah would not drastically recover the sea turtle population in the state. It at most plays a symbolic role as the last resort in the petrochemical complex. Even if BP financially contributes to the Ma'daerah sea turtle sanctuary project, it is still doubtful whether this contribution can offset the negative impact on other beaches in the Paka-Kerteh rookery because Ma'daerah had not been a considerably productive beach in 1980s in terms of turtle nesting. As far as the records of past conservation conferences are concerned, nobody openly proposed to remove any facility on the former nesting beaches. This is in sharp contrast with the strict measures proposed in the 1987 conference, to level houses and shops at Rantau Abang. Stringent restrictions on coastal development collide with the interests of the petrochemical industry; whilst no conservation project is able to operate without the financial contribution from the petrochemical industry. This is the profound limitation of sea turtle conservation in Terengganu.

¹¹² Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary project on 26th, August, 2007

5.6.3 Eco-tourism

The WWF and MEKAR group try to promote eco-tourism around the Ma'derah sea turtle sanctuary¹¹³. They expect the additional income gained from tourism could compensate for the opportunity cost of giving up turtle egg collection:

Another thing that they do say is “what do I get. Do you say turtles give us benefit? What I get, what is the benefit? If the turtles are protected, what do I get? I still can't eat eggs”. Only what you can say to them is “Look, if the turtles swim in your place, people come to your place for eco-tourism. If tourists come, they will buy foods from your place. You can run chalets. It gives money to you. You can sell souvenir and handicrafts”¹¹⁴.

Amran also disclosed that he tried to promote homestay programmes so that the local fishing village could gain incomes through turtle eco-tourism:

Bila ramai pelancong datang ke pantai Ma'derah atau ke pantai kampung tengah, dia akan mendatangkan pendapat sampingan. Saya dalam cadangan untuk menubuhkan homestay di kawasan labohan, gulugor di mana jika pelancong ramai datang, sekarang mereka datang ke pantai Ma'derah. Kita cuba nak manarik mereka duduk bersama dengan orang kampung sebagai homestay. Ini akan mendatangkan pendapatan¹¹⁵.

Kita ada dialog dengan nelayan di mana kita membeli input kepada mereka dan mereka menyuarat balik. Salah satu suara yang saya masih ingat pernah ditimbul ialah apakah faedah yang mereka akan dapat dengan menyatui program-program MEKAR. Mereka mahu sesuatu hasil. Jadi saya

¹¹³ According to Ramlee bin Abdullah, head of Fishermen's Association in Kerteh and Kemasik, Optima Eco-care project was also informally proposing to promote eco-tourism in Kerteh. Optima had informed him that night river cruise to watch fire flies and bird-watching could attract tourists. Fire fly watching was once a popular tourist attraction in Kuala Selangor area where the head quarter of the Malaysian Naturalist Society was located until recently.

¹¹⁴ Interview with Rahayu Zulkifli, WWF Programme officer taking charge of Maderah sanctuary Project on 26th, August, 2007.

¹¹⁵ Interview with Amran Salleh, Head of Ma'derah Khaznah Kita(MEKAR) group and principal of Kerteh Secondary School, on 27th July 2007, in Kerteh.

beritahu mereka tentang pendapatan sampingan, sembur ekonomi yang boleh dijaga daripada pemeliharaan penyu seperti saya tadi sudah kata¹¹⁶.

On the other hand, Abd Halim Mat Noor, the Chief Ranger of Ma'daerah sea turtle sanctuary, on the other hand remarked that tourism should be carefully controlled:

About eco-tourism, tourist visit to see the turtles, we try to minimize it. So far, I think, the maximum number of tourists to see turtle is about 30 a night. I think that is good because we can control the tourists¹¹⁷.

His opinion mirrors the careful attitude of the Department of Fisheries Terengganu, which has rigidly controlled tourism in Rantau Abang for decades. These interviews reveal that promoting eco-tourism in Ma'daerah and Kerteh is still at a vague stage. Little consensus has been achieved with regards to the degree of tourism that should be promoted¹¹⁸.

5.7 Discussion

The chapter dealt with the arena, stake holders, and consensus amongst them. The conclusion of the chapter relates with the rest of the study as follows.

Chapter 2 briefly introduced the cases of sea turtle conservation in developing

¹¹⁶ Interview with Amran Salleh, Head of Ma'daerah Khaznah Kita(MEKAR) group and principal of Kerteh Secondary School, on 27th July 2007, in Kerteh.

¹¹⁷ Interview with Abd Halim Mat Noor, Chief Renger of Ma'daerah sanctuary, on 9th July, 2007 in Rantau Abang

¹¹⁸ Even though WWF offers "a weekend with turtles" program to invite tourists to the sanctuary, this programme does not benefit the local fishermen enough because tourists will choose to camp in the sanctuary and food is offered by the WWF. Local fishermen hardly know about this programme and no fishermen mentioned this programme as a source of his additional income during the researcher's fieldwork.

countries, threats to the species, and the main nesting grounds in Malaysia. The cases introduced in Chapter 2 more or less focused on poverty. However, as described in the first section of this chapter, the economic status in Southern Terengganu differs from those cases. The study should be interpreted as a case of conservation under rapid industrialization of a middle-income nation rather than a case of a poor rural community in a Third World country. Nonetheless, a curious fact to note is that the project design of Ma'daerah is tailored to tackle typical problems in a Third World country. Amongst the threats introduced in Chapter 2, the loss of habitats is an especially severe problem in our case. Further, it is assumed that turtle deaths caused from by-catch, or accidental ingestion by turtles should happen more frequently because artificial fibre and plastic bags have become widespread as the petrochemical industry flourishes in the country. Therefore, it can be deduced that a conservation project would not have the ability to mitigate the dramatic decrease of turtles as long as it only deals with problems in fishery villages. Chapter 2 also introduced that Terengganu far exceeds any other state in Peninsular Malaysia in terms of nesting numbers of sea turtles. Unfortunately, this chapter must announce that the major rookeries of the green turtles have been lost to land development. An ironic fact is that the protection of green turtles was neglected because of the worldwide concern for survival of the leatherback. The fishery officers and the state government started paying attention to green turtles only after the survival of leatherback

turtles was almost extinct without much hope for recovery. The license issued by the state government had allowed for the collection of eggs of the green turtle.

Chapter 3 outlined the conceptual framework of this study. There exist two major viewpoints - the utilitarian, and the preservationist viewpoints in terms of conservation. The concepts of co-management and community-based conservation were also reviewed. Key terms to assess a conservation project are such as opportunity cost, transaction cost, external diseconomy, consensus-making, and strategic behaviour were introduced.

This chapter concludes that the utilitarian viewpoint has been an underlying method to past conservation projects in Terengganu. Tourism promotion and revenue from sea turtle eggs were the motives of the state government. The survival of the leatherback was of great importance to the state government as well because turtle watchers had accounted for most of the visitors to the state until early 1990s. This is also the reason why green turtles have not been diligently protected. As long as the charismatic giant leatherback turtles nested, the green turtle did not bear any importance as a tourist attraction. At the same time, the state government did not choose a complete ban of turtle egg collection because it meant relinquishing their revenue from the issuing these licenses. Thus, collecting eggs of the green turtle for commercial purposes has remained legal even after the species was listed on category I-B in the red data book in 2004. Concerning the degree of commitment of the government, the chapter concludes that the government has had a

very strong presence in sea turtle conservation in Terengganu. Even the Ma'daerah project should be categorized as co-management because the decision-making and planning role is usually the responsibility of the government. The government expects local fishermen to provide information and act as a labour force to facilitate the ready-made project. The project does not pursue a social change to achieve a kind of grass-roots democracy as some literature (Western and Wright, 1994, Wondlleck *et al*, 1990) have promoted.

Regarding the opportunity cost of the project, this chapter concludes with the following points. As far as the three stake holders dealt in the chapter are concerned, the opportunity cost to restrict traditional coastal fishery activities has been small enough to be accepted. Even fishery officers did not oppose the restriction of operations of the coastal fishing community because they intend to gradually diminish such small-scale fisheries. International pressure on over-fishing and by-catch also led the fishery officers to impose the restriction. On the contrary, restricting the operations of the petrochemical industry was obviously too significant, even though several documents reveal that criticism against the industry surely exists. No marine biologist has boldly called for the removal of any of the petrochemical complex facilities. With regard to transaction cost, the Rantau Abang project has played a vital role in reducing it. The 1987 roundtable meeting managed to enhance the communication between stakeholders. Similar meetings have been held frequently between parties who have maintained cooperative relationships

amongst one another. This relationship has facilitated the setting up of a new conservation project. The transaction cost to launch community-group activities in Kerteh was also small owing to the cooperation of the leaders from the existing community groups. In short, a consensus for sea turtle conservation was built very smoothly owing to the cooperation of the local elites.

Further, the external diseconomy stemming from the petrochemical industry has been well compensated by financial contribution of the industry towards environmental programmes such as the Rantau Abang sea turtle sanctuary, the Ma'daerah sea turtle sanctuary, and the Eco-Care project. In this sense, sea turtle conservation efforts in Terengganu present a good practice of the management of the externality, which have been considered the crux of conservation (Barkley and Seckler, 1972; 124-134, Weddell, 2003; 288-289). The consensus-building amongst the local elite was also successful in this sense. Nonetheless, designating Ma'daerah as a sanctuary would not compensate for the loss of the other former nesting beaches in the Paka-Kerteh rookery, as appropriate management of external diseconomy does not necessarily provide a biologically-meaningful solution. This is a crucial theorem which this study intends to pose.

Concerning the relationship between the managing parties and local fishermen, this chapter revealed that the Ma'daerah case shows a great similarity with the Costa Rican case criticised by Campbell (Campbell and Smith, 2006, Campbell, 2007). Campbell and

Smith (*op cit.*) reported that volunteers participating in the sea turtle conservation project in Costa Rica regarded fishermen as the central problem and considered them the main target of enlightenment. The volunteer mindset was that the awareness of the fishing community is much lower than that of volunteers. The interview with project managers of WWF cited in 4.4.4 presents a similar negative perception towards local fishermen. Since the Rantau Abang workshop, the local fishermen have been the target of enlightenment for WWF members. Further, the relationship between rangers from the Department of Fisheries and the local fishermen remains unchanged despite the introduction of a new approach in Ma'daerah. Rangers from the Department of Fisheries have confiscated illegal nets. As the interview with the Chief of the Turtle Information Centre shows, fishery officers attend the dialogue sessions as confiscators. The sessions have been used merely for collecting information and the actual dialogue has never occurred. Some fishermen purposely elude the sessions. The situation is exactly similar with the case reported by Wongbursarakum (2003) . As Wongbursarakum pointed out, these fishermen are exercising "passive resistance" against sea turtle conservation.

Within the framework of political ecology introduced in the firsts section of the chapter, the chapter highlights the dominant influence of petrochemical industry. As some marine biologists pointed out, loss of habitats due to the land development in the coastal area has been a main cause of the decline of sea turtles. The habitat loss obviously stems

from the rapid growth of petrochemical industry. Against concern of the biologists, little restriction has been imposed on the expansion of the industrial area thanks to the overwhelming power of the petrochemical firms. It is also noteworthy that the financial resource for sea turtle conservation in Southern Terengganu was exclusively allocated to the programmes targeting small scale coastal fishermen and tourists in accordance with the proposal of petrochemical industry, which has been the sole sponser for the sea turtle conservation in the state. The existing programmes implemented in the state give us impression as if educating coastal fishermen were the panacea for sea turtle decline, but, in reality, these programmes can hardly mitigate structural problems such as loss of habitat. Taking the initiative of these programmes, petrochemical industry could even gain its 'clean and green' image as the guardian of natural heritage. Further, the cost of sea turtle conservation is unevenly distributed even within fishery sector. The Rantau Abang agreement resulted in strict regulations on small scale coastal fisheries, which are deemed to be a dying industry with small say. On the other hand, installation of turtle exclude devices for trawlers was not even discussed.

The next chapter, based on fieldwork in Kerteh, will be linked to this chapter in several ways. This chapter revealed that fishery administrators were willing to accept restrictions on coastal fishery activities. It also mentioned that traditional fishermen are the core members of the community whom the petrochemical industry must carefully deal

with. Three questions emerge from this scenario:

1. Is sea turtle conservation acceptable to the local fishermen?
2. Do fishermen feel any benefit in protecting turtles?
3. How do fishermen view the decrease in turtle numbers?

The study so far concludes that the opportunity cost of sea turtle conservation is small enough for fishery officers. However, as Chapters 2 and 3 have presented, it is the local community who are most likely to incur such opportunity costs of a conservation project. If the cost is too significant to them, the project could eventually lose their support. Even if the fishermen do not oppose the project explicitly, their unwillingness might result in indifference as debated in previous chapters. Furthermore, the Ma'daerah project focuses on awareness-raising at a grass roots level. This assumes that turtle by-catch and turtle egg consumption are the main contributors to the decrease in turtle population. However, do fishermen agree with this assumption? They might consider the cause of the decrease being due to other reasons, and consequentially find the project meaningless. The next chapter shall address these questions by attempting to determine the viewpoints of the fishermen with regards to these points. Subsequently, it attempts to verify the hypothesis attained through the quantitative survey.

CHAPTER 6: FINDINGS

- FACTORS BEHIND FISHERMEN'S BEHAVIOUR

6.1 Introduction

In the previous chapter, the study discussed two points; the context of the local economy in which sea turtle conservation projects are embedded, and the interest of the major stake holders. The findings of the previous chapter showed us that local fishermen have almost no opportunity to reflect their own opinions on sea turtle conservation, even though the Ma'daerah project in particular emphasises it to be a community-based conservation project. The previous chapter also depicted the fishermen to be the target of enlightenment or a source of labour. It was also clear that the prejudice towards fishermen still lingers, as statements of the managers of Ma'daerah sanctuary have told us.

Provided with these findings, several questions were brought up. Are fishermen really ignorant about the importance of sustainability, and are they indifferent when it comes to conserving endangered species? How do fishermen actually view sea turtle conservation? What are the factors encouraging or discouraging them from supporting sea turtle conservation? This chapter aims to address these questions. Findings of both the qualitative and quantitative research shall be presented.

The first section, qualitative analysis, aims to elucidate the viewpoints of

fishermen in terms of sea turtle conservation. Despite a strong emphasis on having a community-based feature, the Ma'daerah sea turtle conservation project has been conducted without a systematic survey on the fishermen's own opinions pertaining to conservation. Whilst some key informants consider fishermen to be completely alien to the concept of conservation, it is still unclear to what degree fishermen have so far accepted this idea and how much their viewpoints differ from those of conservationists. Additionally, fishermen have been an underrepresented stakeholder in the decision-making process. Even though fishery officers have participated at roundtables, it remains unclear if their policies are in harmony with the vision of fishermen. Is there any discrepancy between the officers and fishermen in terms of economic interests? This section aims to answer such questions.

Section 6.2 is divided into four sub-sections. The first subsection which is on sea turtles, describes how fishermen consider the species. To what degree are they aware of its endangered status? What do they regard as the main cause of their decline? What are opportunity costs and potential benefits of sea turtle conservation to fishermen? Do they empathise with the reptile? The second subsection deals with the perception of fishermen towards themselves. Two concepts, a sense of victimisation and a sense of powerlessness will be presented here. The third subsection focuses on the relationship between the managing parties and fishermen. It points out that the fishermen acknowledge the

necessity of marine environment management, yet their tendency to depend on the government hampers their acceptance of community-based programmes. The fourth subsection presents the viewpoints of fishermen regarding turtle egg consumption. It explains why fishermen feel a much lower sense of guilt in consuming turtle eggs than the use of gill nets, even though both trigger the decline of turtles.

Section 6.3 covers quantitative analyses, and aims at elaborating the findings of the previous section. The statistical methods used here are cross-tabulation, exploratory Factor Analysis, analysis of variation, and Path Analysis. The first subsection shows personal attributes of the respondents. Cross-tabulation will be applied to identify features of the samples. The second subsection explains how the findings of the qualitative analysis are converted into variables and statistical models. This subsection prepares a sub-sequential analysis to be conducted in the next three subsections. The third subsection performs an Exploratory Factor Analysis (EFA). The purpose of this analysis is to identify the latent psychological factors that give impacts on the attitude of fishermen towards conservation. The factors identified through this analysis are also used as variables to be examined in the fourth and fifth subsections. The fourth subsection examines how personal attributes mentioned in the first subsection affect personal attitudes towards conservation. The fifth subsection testifies the major hypotheses of the qualitative analysis. The final section discusses the findings of the chapter.

6.2 MGTA Analysis on mentality of fishermen

This section presents the perception of fishermen toward sea turtle management. It can be divided into four subsections. The first subsection on sea turtles, discusses whether fishermen recognise the endangered status of sea turtles and the negative impacts of their fishery operations to the species. It also covers how fishermen subjectively evaluate opportunity cost stemming from sea turtle conservation, and whether the fishermen feel merit to protect sea turtles and empathise with them. The second subsection puts the focus on the fishermen themselves; posing a hypothesis that a sense of victimization and a sense of powerlessness are the main latent factors preventing fishermen from participating in conservation programmes. Following this argument, the third subsection is on management, and further examines the psychological factors that undermine the support of fishermen to community-based conservation. The fourth subsection is on turtle egg consumption, and presents the logic of fishermen of justifying their continual egg consumption.

The first subsection corresponds to the discussions in the previous chapters which include a lack of awareness on the endangered status, low affinity towards sea turtles, and attention for sustainability is commonly considered to hamper conservation projects. Great opportunity costs will also call for resistance of the local community against conservation. As far as these factors are concerned, the conditions of the studied villages are better than

some which the key informants mentioned. However, it is hard to confirm if the Ma'daerah sea turtle sanctuary project is actively supported by fishermen as several key informants mentioned. The latter three subparts attempt to present the reasoning.

In this section of the chapter, the MGTA is applied for coding the records of interview with fishermen. Words in italic fonts in the text are concepts generated from raw records of the interview. In this part, the name of each respondent are all kept anonymous and replaced by numbers. This part will lead to the hypotheses to be elaborated on in the next section.

6.2.1. On sea turtles

6.2.1.1 Awareness on the endangered status

A question pertaining to sea turtle conservation is whether fishermen properly recognize the endangered status of turtles and the impacts of their gears to the reptile. Raising awareness is a basic goal for a conservation campaign. Interviews revealed that fishermen are basically aware of the endangered status of sea turtles, and also clearly recognize that certain fishing gears are harmful to the marine creature. Several informants also concern the various kinds of human induced impact on turtles. How fishermen recognize the problems are addressed in this subsection.

The interviewed fishermen show *awareness on decrease of turtles*. Some of them clearly consider turtles as being on the edge of extinction and express their concern by

explicitly using the word ‘pupus’ as follows:

Pada masa kini penyu hampir pupus disebabkan mungkin sebab-sebab pukat, hampir kini sampai sekarang ini lah makna pupus. Bukan tidak ada. Tetapi berkurangan (Respondent no. 7)

Kalau kita tak jaga dia akan tiada lagi, pupus turus, kosong, suatu masa nanti (Respondent no. 21).

Awareness on the impact of fishing activities consists of *awareness on hazard* and *awareness on illegality*. *Awareness on hazard* means the recognition of fishermen admitting harm of two particular fishing gears, gill nets and trawlers on sea turtles. Both these gears frequently result in the by-catch of sea turtles and the former has thus far been banned to protect turtles. *Awareness of illegality* refers to the situation that fishermen clearly recognize regulations on gill nets:

Sekarang penyu kurang, nelayan sendiri yang menggunakan pukat yang diharamkan oleh kerajaan, bila diharam nelayan pantai tidak punya pukat itu ambil (Respondent no. 8)

Pukat pari punya fasal penyu jadi mangsa dia. Sebab itu pukat penyu sangkut dan tidak boleh lepas. Pukat pari ini bukan kata mata kasar mata empat bekas inci sahaja. Mata empat inci lima inci pun sangkut je mati juga. Dia terus sudah kena tangan dia sudah sangkut tiba-tiba dia tidak boleh melepaskan diri (Respondent no. 3).

Sebab itu lah perikanan sekarang dia buat satu tindakan hantar pekerja dia menyelidik nelayan-nelayan di kawasan kita menggunakan pukat yang

larang. Mata pukut 6 inci ke bawah sahaja nelayan boleh pakai lah, kalau 7,8,9.10 inci, memang salah (Respondent no. 8)

Fishermen witness sea turtles being entangled in their nets. Moreover, by-catch is the main agenda in “dialogue with fishermen”. Consequently, by-catch is perceived as the main cause to drive sea turtles to extinction. Many respondents even regard by-catch as the sole cause of the decline in sea turtles. Fishermen are fully aware of fishing operations giving an impact on sea turtle population.

Some respondents even recognize the impact of drastic anthropogenic change of the ecosystem. They are aware of the impact of the petrochemical industry and plastic rubbish, though levels of such awareness remain lower compared with their keen awareness on the impacts of fishery.

The advent of the petrochemical industry in the late 1970s has entailed dramatic coastal development. Respondents describe beaches around Ma'daerah as follows:

Saya ingat 20 tahun dahulu banyak penyu. Selepas 20 tahun dahulu mungkin kurang. Saya ingat tahun 78, dan 79 penyu tempat minyak ada lah. Dulu first time saya kerja tempat minyak projek itu dengan company Jepun. First time, gitu memang tempat penyu banyak penyu memang banyak. Sekarang susah nak tengok, dalam masa 7 hari ada lah 2 ekor penyu dapat tengok (Respondent no.13).

Sebab pada masa itu saya tadi sudah kata, sepanjang pengetahuan saya, sebelum ada terdapat sebuah pemproses kilang petroleum, itu tempat yang paling sesuai sudah pun ditubuhkan dengan persekitaran yang agak sempit, gelap, merarik, sebab penyu dia tidak berapa suka dengan persekitaran yang begitu bising dan terang. Jadi di situ kita tengok tempat yang menarik dan sangat-sangat

sesuai untuk program itu (Respondent no.21).

Besides the loss of sandy beaches referred to by Respondent no. 21, the increase of crude oil carriers and the degradation of water quality are pointed out:

Saya ingat ada jugak keburukan, ada tak seratus peratus lah, penyu nak mendarat pun tidak boleh, jadi ada kapal di kawasan minyak ini (Respondent no.15) .

Itu memang mati lah sebab dia buang minyak, macam menafas dok (Respondent no. 20)

Some also mentioned the hazards of plastic rubbish. They witnessed turtles choking from littered plastic bags:

Misalnya dari alam sekitar iaitu masalah pembuangan plastik akan jadi masalah kepada dia, kalau macam plastik yang berwarna merah yang saya tahu, plastik warna putih dia akan tengok serupa macam obor-obor mungkin kadang-kadang dia tengok makanan terus makan (Respondent no.19)

Sepanjang ingatan saya, pernah saya lihat, keracunan, penyu itu memakan plastik, makna bahan-bahan buangan toksik, membuatkan ia mati atau tak berminat datang lagi ke tempat yang sama (Respondent no. 21).

As explored, fishermen clearly recognise how much sea turtles are endangered.

They are also fully aware of the hazards caused by some of the fishing gear. Although informing the local fishermen about the endangered status of the protected species is a common practice for awareness-raising, such campaigns will not be productive under the

conditions of the villages studied.

6.2.1.2 Opportunity cost

As discussed in Chapter 3, the opportunity cost pertaining to conservation has an impact on a conservation project. A project would be unacceptable for the local community if they had to incur severe opportunity cost. The opportunity cost of sea turtle conservation is fortunately small for the fishermen.

Basically, *turtles are harmless*. Turtles attack neither human beings nor livestock. Considering that their feeding habits rely on sea weeds or jelly fish, the species are harmless to fishery resources too. Hence, sea turtles themselves do not entail any cost. The greatest cost of conservation in the village context is restriction on specific fishing gear; lucrative gill nets. Respondent no.3 and no.22 explained this as follows:

Dia kalau kita tahan pukat pari, sebutulnya nelayan memang suka pada pukat itu. Sebabnya hasilnya begitu lumayan. Dia tidak kira masalah kepada penyu (Respondent no. 3).

Yang lain, kita nak dapat pari, susah sedikit. Mungkin tak dapat. Jadi, cara pukat itu pari sebesar mana, seberat mana pari pun tak akan lepas, tentu mati. Tentu dapat. Selain pada itu, kita tujuan memasang pukat pari (Respondent no.22).

Eventually, several fishermen amongst the community began using the gear illegally .

Respondent no.19 mentioned as follows:

Fasal sekarang ini aktiviti pukat pari ini dia jalankan lebih senyap, dia orang mencari yang pengguna pukat pari ini dia orang buat penyu jadi pupus

dengan cara tidak selamat lagi lah (Respondent no.19).

Misalnya pukat pari kita bokeh hapuskan terus, tetapi kita hendak hapuskan pukat pari memang susah, fasal pukat dia akan sentiasa ada dijual, kalau kita hendak halang dia memang susah jugak fasal dia buat aktiviti senyap (Respondent no. 19).

Even though the regulation might impose certain opportunity costs to the fishermen, none of the respondents displayed angst against the restriction. A majority of them instead showed support for the policy. Owing to decades of government efforts, the awareness on hazards and awareness on illegality has already been instilled into the community. Even though some respondents admitted that a small number of fishermen still using illegal gear exist, these respondents deemed them to be *irresponsible fishermen*. In this regard, several respondents brought up the idea of their loss; it literally means somebody using illegal nets might incur sanctions whilst the majority of fishermen are free from it. The following remark shows a typical example:

Nelayan tertentu sahaja. Bukan kata semua lah pukat pari. Orang yang tidak punya wawasan tidak bertanggungjawab. Sebab itu dia masih mengguna pukat itu (Respondent no. 3).

Pada pendapat saya penyu brekurangan pada sekarang ini disebabkan pupus kerana pukat-pukat lah. Seperti pukat tunda, pukat pari. Yang jadi dan ada juga pihak-pihak yang tidak bertanggungjawab menangkap penyu itu (Respondent no. 7).

Pihak tertentu yang dapat masalah seperti tauke-tauke pukat tunda, dan nelayan guna pukat pari, pada kita memang tiada masalah apa-apa

(Respondent no. 19).

Further, a respondent suggested that the opportunity cost stemming from the restriction on gill nets is an *old problem*:

Terjejas sumber pencarian. Sekarang sudah lama di antara perikanan maka itu ada nelayan tidak peduli, sunan kata nelayan itu degel. Dia masih menggunakan peralatan itu. Walaupun diambil tindakan keras (Respondent no. 3).

Satu sahaja yang ada perselihan faham nelayan dan Jabatan Perikanan. Walaupun diambil tindakan, sentiasa pun dibuat operasi begitu besar-besaran terhadap nelayan yang menggunakan pukut-pukat yang diharamkan. Pukat pari, rawai, dan sebagainya. Benda ini adalah sudah lama (Respondent no. 3).

His explanation can be interpreted in the following way. As introduced in Chapter 2, the regulation on gill nets has been included in the Fishery Act enforced in 1957 and amended in 1982. It dates back to decades before the community-based programme was launched. At the time, the introduction of a community-based approach did not impose any additional costs on fishermen in this regard. Having been implemented for decades in the regulation is long enough for the majority of fishermen to absorb its opportunity cost.

Under these conditions, the opportunity cost of the Ma'derah sea turtle sanctuary is relatively small. At the least, fishermen have no incentive to violently resist against the project, unlike some cases introduced in earlier chapters.

6.2.1.3 Benefits

An important question yet to be answered is whether fishermen feel any benefit in protecting sea turtles. The respondents talked about the merit of conservation from both preservationist and utilitarian view points. A noteworthy fact is that, the border between these utilitarian and preservationist views is very blur in the context of fishery villages. This subpart tries to illustrate the mindset of fishermen without adhering to the fixed typology. Instead, it tries to explain how the two notions interrelate with their experience.

Fishermen consider turtle watching an attractive experience. Several fishermen remarked that their experience of watching turtles in their childhoods increased their affinity to sea turtles. However, in the village context, the experience is strongly associated with turtle egg harvesting. Even if watching turtles in itself is a joyful experience for them, its attraction would definitely be strengthened by the opportunity to harvest. The remarks made by Respondent no.19 is a good example:

Sebelum generasi kita, dulu orang mengambil telur, kalau di sebelah hampiran tempat lain dia orang ambil daging. Pada masa itu orang kampung makan telur penyu belimbing, agar, tuntong, dia ada banyak spesis. Saya pun pernah ikut bapa saya pergi mencari telur pada masa dahulu (Respondent no. 19)

Kalau kita sentiasa mencari telur, penyu misalnya kita kawan dengannya kita boleh agarkah, tetapi saya rasa bilangan kurang, jadi kurang dalam 10 tahun ini lah (Respondent no. 19).

Respondent no.19 is one of the fishermen who has showed a deep interest in conservation. As he

remarked during the interview, his interest in sea turtles originates from his own experience of turtle egg harvest with his father. After he had recognized a dramatic decline in nesting numbers, he became very aware of the necessity for conservation. Both an affinity for turtles and the materialistic expectations of them can coexist under this context. Thus, the majority of informants recognize the benefits of sea turtle existence as follows:

Kebaikan penyu boleh makan telur dia dan generasi kita bokeh tengok dia (Respondent no.6).

Untuk orang ramai, untuk makan telur, untuk orang pelancong (Respondent no. 12).

As Respondent no.12 mentioned, fishermen regarded sea turtles as an *attraction for tourists*.

This is another benefit that fishermen acknowledge regarding conservation:

Kita suka tengok orang melancong orang mari mungkin pendapatan bertambah, orang kampung pun boleh cari makan ah (Respondent no. 1)

Penyu adalah kebaikan kita. Penyu ini untuk menarik pelancong ke sini. Telur dia pun boleh diguna dan berbagai untuk menarik minat pelancong. Kalau kurang, pelancong nak tengok pun tak ada. Suka banyak tengok di Rantau Abang- Rantau Abang tahun 80-an 90-an memang semua pelancong luar negara mari datang sini (Respondent no. 8) .

The first citation shows the expectation of additional income. As the second citation shows,

past prosperity from tourism in Rantau Abang is a vivid memory for local fishermen. His viewpoint suggests that turtle-watching tourism is still interwoven with their egg consumption¹¹⁹.

As villagers do, tourists used to enjoy turtle watching whilst they taste eggs. A proper estimation of benefits to fishermen requires an understanding of the whole subsistence of which turtle watching, tourism, and egg consumption are merged. Dichotomy such as the preservationist and utilitarian; pro-conservation and anti-conservation, does not faithfully reflect the mindsets of the villagers. This ambiguity is important in the burgeoning of conservation in villages.

6.2.1.4 Burgeon of conservationism

There are two phenomenons that indicate the burgeon of conservation in villages. The willingness of several fishermen to partake in conservation activities by raising awareness amongst their peers, shows that conservation programmes have gone against the initial pessimistic estimation regarding the readiness of fishermen to accept conservation. Both the affinity and utilitarian expectations lie behind these actions. Two concepts, *our treasure* and *for coming generations*, emerging from interviews conducted present a positive attitude towards sea turtles and conservation.

¹¹⁹Rahayu Zulkifli, the WWF program officer, also mentioned that the demand of tourists is a major factor triggering egg collection. According to the author's interview with her in August 2007, she pointed out that consumption of turtle eggs amongst the local people had declined due to high prices. On the contrary, tourists from the West Coast and Singapore still consumed the eggs as local delicacy.

A number of fishermen denoted their affinity for sea turtles. They mentioned that they are accustomed to helping turtles entangled in nets. They use daily expressions such as ‘*rasa sayang*’ and ‘*kesian*’ to express their feelings. Frequent encounters with sea turtles have in several instances fostered a natural affection towards them. Awareness raising programmes conducted in villages have enhanced this natural affinity. The remarks made by Respondent no.7 are a good example of this:

Penyu ini saya rasa jugak beri kebaikan pada kita kerana khaznah laut ini kalau boleh kita tidak mahu pupus khaznah laut sebab generasi kita dapat kenal penyu itu cara mana, telur pun cara mana. Jadi kebanyakan generasi kita tidak kenal ibu penyu dengar sahaja penyu. Jadi satu kebaikan lah kalau ada penyu itu di darat (Respondent no.7)

Setahu saya pihak tertentu untuk melindungi penyu ini di jalankan oleh TUMEC, dan telah ditubuhkan satu persatuan MEKAR iaitu khazanah rakyat jadi untuk melindungi penyu-penyu ini supaya tidak dipupus oleh nelayan-nelayan. MEKAR ialah khaznah, tapi dia ada satu pertubuhan yang ditubuhkan di Kerteh ini. TUMEC yang disokong oleh PETRONAS untuk menjaga perlindungan penyu ini lah. Jadi di dalam persatuan MEKAR, dan MEKAR ini adalah ahli-ahli jawatankuasanya terdiri daripadanya anak Kerteh, Paka, dan Kemasik (Respondent no.7).

In these statements, he describes sea turtles as *our treasure*. ‘Sea turtles, our treasure’ is a slogan of the WWF campaign. As the second citation shows, he also knows about community activities in detail. His usage of the word *our treasure* suggests that there is influence from the WWF campaign. Following the remarks made by another informant reflects the influence from the campaign more clearly:

Penyu itu adalah sejenis semula jadi, anugeran tuhan kepada manusia. Sejenis keturunan dinasor (Respondent no. 21).

Being a survivor from the age of dinosaurs is an expression used in the leaflets disseminated by the WWF. These citations prove that the information disseminated by the WWF has managed to reach fishermen.

Another concept to note is *for the coming generations*. This concept contains two ideas - first, it bears the idea that existing conservation programmes will benefit the next generation for decades; and second, it stresses that equity between generations must be assured. The consciousness for the future serves as an important bedrock to support conservation. The phrase, *for the coming generations*, is used not only in the WWF leaflet, but also in various publications of the Department of Fisheries where the latter uses this term to promote fishery resource management in general. It has already penetrated into the fishery community as the following statements show:

Kalau ada penyu memeng faedah kepada kita. Bagi semua generasi akan datang. Contoh kalau penyu itu ada generasi akan datang anak cucu kita boleh dapat lihat penyu (Respondent no. 3).

Masa kita dapat kesedaran tentang kebaikan pada kita misalnya industri pelancongan untuk generasi kepada kita atau generasi akan datang, mungkin anak sendiri tidak berpeluang untuk melihat penyu itu sendiri, kalau dapat lihat pun di dalam gambar. Tetapi kalau nak tengok dengan nyata

dia bertelur pun mungkin kita tengok dengan kasih sayang
(Respondent no. 19).

Itu memang baik fasal benda, bila penyu banyak telur banyak jadi keuntungan di Malaysia ini. Dia harga memang mahal, kita memantau dan memelihara penyu seterusnya untuk generasi akan datang (Respondent no.1).

Citations show that there are variations in this idea. The first citation does not mention the utilitarian value of turtles, whilst the second and third citations do. The third citation is far from the response that conservationists expect, as such materialistic expectations encourage the practical management of resources. Respondent no.19 presents another variation of this concept:

Saya rasa memang tiada masalah tetapi kita boleh ajar generasi baru, kalau kita nak mengajar generasi lama mungkin mereka sudah kolot maknanya tidak terbuka. Misalnya kita hendak lah memberitahu kanak-kanak sekolah mengenai ini dari darjah sekolah rendah, sekolah menengah, kalau sekarang ini mungkin universiti dia akan faham tetapi kita kena dari budak-budak, kanak-kanak (Respondent no. 19)

‘Generasi baru’ in this remark is the target for an active approach of the respondent himself whilst ‘generasi akan datang’ in earlier citations can be simply described as beneficial recipients. This person sequentially mentioned the importance of environmental education in the following remarks:

Misalnya dari alam sekitar iaitu masalah pembuangan plastik akan jadi masalah kepada dia, kalau macam plastik yang berwarna merah yang saya tahu, plastik warna putih dia akan tengok serupa macam obor-obor mungkin kadang-kadang dia tengok makanan terus makan, fasal kawan saya pernah tengok penyu mati tepi laut ada plastik dalam mulut dia, mungkin itu sebab dia boleh lemas atau boleh sebab mati. Kita kena latih ajar dari kanak-kanak atau budak sekolah lebih menyayangi (Respondent no. 19).

Discussion up to here can be illustrated as Figure 6.1 on the next page. The awareness of fishermen is the most basic pre-condition. Fishermen are aware of the serious decrease of the species and the impact of fishery operations on the reptile. This is a visible phenomenon for fishermen dwelling in coastal villages. Fishermen also feel responsible to save turtles to a certain degree, even though the merits they attain may be materialistic. At the same time, the majority of fishermen deem the opportunity cost of conservation small enough as none of the fishermen blamed their hardships on it. Under these conditions, conservation efforts burgeon in the villages. The commitment of conservationists is serving as a catalyst to foster an affinity towards sea turtles, enhancing the current sensitivity felt *for the coming generation*.

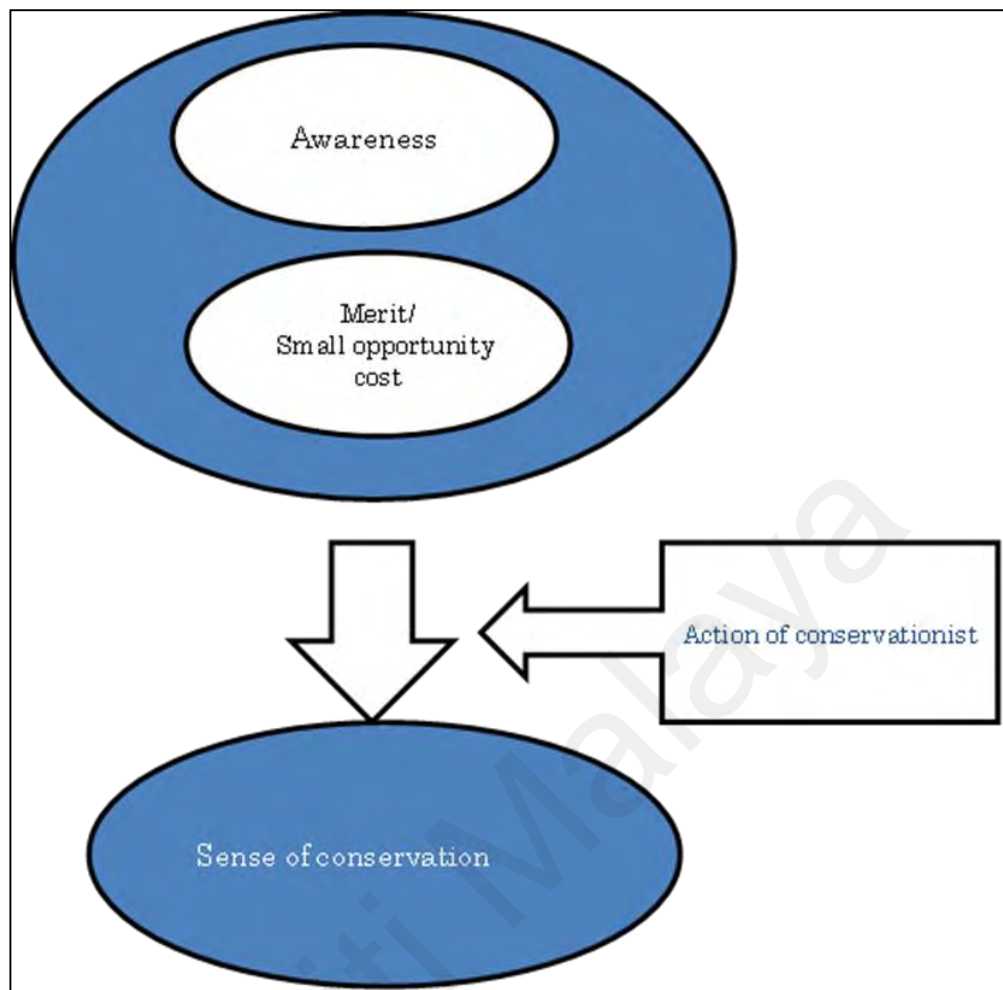


Figure 6.1: The Mental Scheme of the Burgeoning Sense of Conservationism

6.2.2 On themselves

Having examined the perception of fishermen towards sea turtles, this subsection is an investigation of their self-image. As discussed in the earlier subsection, there are prerequisites for fishermen to accept conservation. Nonetheless, the findings presented in the section show us that there are two major mental impediments which are a sense of victimisation, and feeling powerless; preventing fishermen from being actively committed to sea turtle conservation.

6.2.2.1 Sense of victimization

Sense of victimization is a keystone to understand the mentality of local fishermen.

The main issue is that fishermen have a sense of being victimised because of *powerful outsiders* and *mindless foreigners*. These sentiments are discussed in this subsection.

Powerful outsiders is a key term explaining the basic idea of fishermen concerning the decline of sea turtles and the degradation of the local marine eco-system. It highlights the abuse of resources attributed by powerful parties such as trawlers from bigger ports and foreign countries:

Dulu penyu pada tahun 70an banyak di kawasan ini, semenjak ada pukot kokot, pukot pari, pukot yang jenis besar-besar boleh membunuh penyu dan penyu kurang. Semenjak 90 an juga (Respondent no.10).

Pukot kokot itu tauke yang punya. Biasanya dia datang dari Kuantan, Kemaman pun ada (Respondent no.10).

Besar yang menyumbangkan kepupusan daripada pukot kokot yang paling besar. Datang dari Johor dari Kuantan dan Kuala Trengganu (Respondent no.1).

In the second citation, the respondent mentioned the names of two towns which are approximately 70km from the village. The third citation added the name of another town located 120km north. These towns have ports with much better facilities than their own villages. Furthermore, entrepreneurs of these towns run on a much greater capital than

village fishermen; they own big fishing boats with modern gear that include trawling nets.

The perception of the local fishermen is that the by-catch resulting from the operations of *powerful outsiders* is the greatest reason for sea turtle population decrease. The village fishermen also feel that they are victims of outsiders with greater power whereby and increase in commercial boats heightens their *sense of victimization*:

Pukat kokot semasa dahulu kurang. Sekarang pukat kokot besar banyak (Respondent no.2) .

The threats to fishing resources are a major concern of local fishermen as they regard the declining process of sea turtles to coincide with the rise of commercial fishery:

Dahulu penyu pada tahun 70an banyak di kawasan ini, semenjak ada pukat kokot, pukat pari, pukat yang jenis besar-besar boleh menmbunuh penyu dan penyu kurang. Semenjak 90 an juga (Respondent no.10) .

Another commonly accused party are the *mindless foreigners*. Several respondents consider the operations of foreign fishing boats, especially from Thailand¹²⁰, to be a serious threat to sea turtles. Their operations are also considered to be a menace to local fishermen:

Fasal pukat tunda ini keluar malam. Keluar malam dia kehampiran pantai. Dia tujuan dia nak sotong. Tapi penyu masuk. Tapi penyu tahu barang yang salah dia tak dikeluarkan masuk satu tempat ton dia terus

¹²⁰ After degradation of fishing resources in the Thai Gulf, the illegal operation of Thai boats is commonplace in Malaysian waters. Beside active operation of ships from the neighbouring countries, thousands of migrant workers are working for the Malaysian fishery sector.

hantar Siam. Jadi kerajaan tak tahu (Respondent no. 1).

Banyak kurang sebab pukut ah, sebab luar negara pun mari tangkap dia mari tangkap penyu di Malaysia, seperti Thailand (Respondent no. 6).

These remarks well-reflect the threats that local fishermen feel in their daily life. Large scale operations of commercial fishery and the encroachment of foreign boats are common sources of angst for them. They also feel that these factors threaten the local fishing resources. They explain the *damage on fishing resource* as follows:

Kita punya tempat sotong pun habis dia kokot. Jadi susah nak cari makan sekarang (Respondent no.1).

Pukat tunda yang merosakkan harta kehidupan dalam laut semua sekali. Telur- telur sotong biasa kita candak sotong sampai satu minggu paling kurang. Sekarang satu dua hari habis (Respondent no.1).

Besides these complaints on foreign boat operations, the accusations against the *actions of foreign countries* have even more variations:

Sini susah nak dapat kalau ada pun bukan telur sini. Tetapi telur dari Indonesia kerana di Indonesia banyak penyu, penyu dia tak makan telur tak makan juga, pasal itu dia banyak eksport. Saya pernah ke kepulauan Indonesia, dulu pada tahun 70-an telur penyu dia main permainan bowling-bowling sahaja. Betul dia tak makan, kita terok guna dia suka! Betul dia tidak makan, sekarang kita pergi beli pun dia tidak jual, cuma dia bagi free sahaja (Respondent no. 13).

Itu hari saya ada baca berita di sebelah Sarawak iaitu Jabatan Perikanan menangkap bot nelayan asing, bot Philipine merampas banyak penyu yang sudah mati. Di sebelah Thailand juga suka makan daging,

aktiviti dia juga menahan pukuk penyu. Kesan ketara yang menyebabkan kepupusan (Respondent no. 19).

Respondent no.13 is aware of the international linkage of the turtle egg market.

Respondent no.19 knows that citizens of non-muslim countries in the region consume turtle meat as well as their eggs. A discourse on turtle decline arises from this knowledge

- Malaysia does its best to protect sea turtles while other countries do not. Even if the Malaysian government were to take any action to protect sea turtles, the effort is expected to fail due to the mindless *action of foreign countries*.

There is a similar perception of fishermen in regards with the impact of the petrochemical industry on sea turtles:

(Kawasan minyak) ¹²¹ *Tidak ada bahaya sebab apa air laut ini dia begitu besar, sebab dia lepas air minyak kotor-kotor dia sudah rawat, air sudah proses kecuali datang kapal datang daripada luar negara masalah kapal pecah, kapar bocor, itu ada kesan jugalah (Respondent no.17).*

Kawasan minyak tiada masalah, cuma kalau ada penyu ada masalah kesan-kesan minyak daripada kapal, itu yang ada masalah sedikit kalau ada tumpahan minyak daripada kapal (Respondent no. 18).

Both citations criticise *mindless foreigners* hampering Malaysian conservation efforts. In their perception, Malaysia is nothing but an innocent victim. As discussed later, this sense of victimisation partially explains the lack of support for community-based conservation.

¹²¹ Words in bracket are added by the author.

6.2.2.2 Sense of powerlessness

Several fishermen assume that they do not have sufficient political and social resources to solve problems, especially when it comes to handling problems caused by outsiders. This *sense of powerlessness* leads fishermen to remain dependent on the government:

Nelayan tidak boleh ambil tindakan. Yang boleh ambil tindakan ialah jabatan sahaja... nelayan tidak mempunyai kuasa. Kita tiada kuasa kalau kita ambil tindakan kita tiada kuasa jadi orang pukut pulak akan terbabit (Respondent no. 3).

Community-based conservation encourages the autonomous control of fishermen towards *irresponsible fishermen* within the community. As a result of community involvement efforts of the WWF and the Department of Fishery, a few fishermen started cautioning other fishermen considered to be irresponsible. Nonetheless, a common result was *disregard of caution* :

Kebaikan kesan memberi baik kepada kita dan bukan kesan buruk sebab sejak program ini dijalankan dia akan ada sedikit kesedaran pada diri kita. Itu lah kebaikan pada diri kita macam kadang-kadang kita di laut nasihat kepada kawan-kawan kita jangan buang dalam air, kita buang di darat. Ini kesan baik pada kita (Respondent no. 19).

Kalau kita nasihat itu orang dia tidak boleh terima apa yang dilakukan, dia tak nampak. Kadang-kadang dia tak nampak masalah yang akan datang. Itu masalah sekarang tiada duit dia buat hal (Respondent no. 19).

This type of cautioning of fishermen to their peers is not only ignored but also invokes backlash. Even for powerful elder fishermen, it is a grievance to be regarded as a ‘betrayer’ by community members and to lose their respect in the villages eventually. Respondent no.22 remarked as below:

Ini ada banyak, saya sendiri sudah tahu siapa yang memiliki pukut pari. Hari ini, saya cari hari ini. Tapi saya tak perlu buat begitu nanti semua orang benci saya. Semua orang marah saya. Saya tahu. Saya 100 percent saya tahu. Siapa ada pukut pari sebab saya juga seorang nelayan (Respondent no.22).

Another consequence of the efforts made by certain fishermen to control the usage of illegal nets was a *hide and seek* method of the irresponsible fishermen:

Contoh di waktu kita dalam operasi itu, dia pun buang pukut-pukat itu pari atau peralatan yang lain, jadi tidak ada bukti (Respondent no.3).

Pak A tak bawa balik itu barang, Pak A simpan di laut supaya orang tak nampak ini ada prove yang Pak A ini memukat pari, cuma Pak A balik hasil¹²² (Respondent no.22).

After a *disregard of caution* or *hide and seek*, these respondents finally reached the same conclusion that the only way to control the use of illegal nets properly is to ensure the complete ban of selling the gear, and this requires the authority of the government.

¹²² Pak A is the name of a fisherman in village. Following promise with respondents to keep anonymity, the researcher avoided to write the name here.

Fishermen also find themselves powerless when they face problems stemming from outsiders. As mentioned, large commercial boats both from bigger cities and foreign countries bother them as well as the sea turtles. However, solving this problem is beyond their ability.

A sense of victimization and the idea of *powerless fishermen* are intertwined in the mindset of fishermen in following way - the decrease in sea turtle population is a problem resulting from *powerful outsiders*, while a great majority of fishermen in the villages are innocent. The local fishermen even feel sympathetic to sea turtles, a victim of the mindless action of outsiders like themselves. At the same time, however, they feel that saving turtles is not their responsibility. They are nothing but *powerless fishermen* who lack resources and the authority to take action. Being so powerless, these fishermen cannot even control the *irresponsible fishermen* amongst themselves. Apart from that, although some of them have a strong awareness on conservation, they conclude that '*Yang boleh ambil tindakan ialah jabatan sahaja*'.

6.2.3. On management

The former two subsections presented that fishermen are aware of the endangered status of sea turtles, and they are experiencing a crisis with the degrading fishing grounds as well as regarding themselves as powerless victims. This subsection explores their ideas on managing sea turtles and fishing grounds accordingly.

A great majority of the fishermen considered it the responsibility of the government to manage turtles and fishery grounds, whilst few articulated their support for community-based conservation. Several informants expressed the reasons for their frustrations with the new approach.

6.2.3.1 Someone else's duty

Fishermen well recognize that conservationists conduct various programmes in the area. A total of 11 respondents could name the organization, the officers in charge, and the location of the sanctuary. A total of 6 fishermen could refer to details of the programmes and this shows that there is a *sufficient presence of conservation programmes*.

However, it is dubious whether or not they are able to recognize the innovative character of the Ma'daerah project. Conservation is usually linked to hatcheries. Many respondents, including members of the MEKAR group, also consider that maximizing turtle egg harvests in the future is the aim of the project.

Sekarang pantai Ma'daerah itu ada tempat pembiakan penyu
(Respondent no. 17).

Sudah ada baru-baru ini dia buat dekat PETRONAS ini dia membiakkan anak-anak penyu. Ada lepas anak dan tidak jual telur, dia menetas telur anaknya (Respondent no. 15).

Benda itu kita kira ada membiak ada bela di Ma'daerah, makna biar dia biak situ makne lepas situ jugak makne dok kesoh ah, dia ada orang kerja situ. Ada orang pembiak situ maknanya boleh jadi ramailah (Respondent no. 16).

They mentioned the location of the Ma'daerah sanctuary correctly, and recognized that the beach is used for sea turtle conservation. At the same time, it is obvious that they regard the function of Ma'daerah as nothing more than a hatchery. Its function as a centre for community involvement is not acknowledged. The author's hypothesis is that these remarks reflect their perception that sea turtle conservation is the *duty of someone else*.

Remarks of Respondent no.16 below epitomises such perceptions:

Saya buat masa ini jadi kita tidak kerja menda itu, jadi kita kerja lain. Kita kerja nelayan, kan? Jadi dok tahu, kalau kita nelayan ini jadi kita dok sabit pasal penyu ini, tiada apa (Respondent no. 16).

Masalah kekurangan ini jadi saya kurang pasti jugak lah, jadi masalah menda gini jadi kita dok kerja dia, saya tidak main pukut jadi tidak tahu ah, berapa kurang dia jadi kita tidak tahu (Respondent no. 16).

Jadi dia buat kerja dia untuk membiak dia sahaja, jadi kita tidak tahu ia biak atau tidak. Ia duk cara itu kerja dia kita tidak tahu macam mana-mana. Kita dok gi situ (Respondent no. 16).

Hatcheries run by someone else is not a business he is concerned about. He also makes the statement, 'Ada orang pembiak situ maknanya boleh jadi ramai lah', shows his expectation for *someone else* to increase the turtle nesting numbers. Basically, the

performance of conservation is considered to be the entire responsibility of the relevant parties in charge.

In this connection, the author points out that some fishermen support sea turtle conservation as *active consumers*. Respondent no.8 actively takes part in MEKAR group as a volunteer and severely criticizes *irresponsible fishermen*. At the same time, he commented as follows:

Keburukan tiada, penyu adalah kebaikan kita. Penyu ini untuk menarik pelancong ke sini. Telur dia pun boleh diguna dan berbagai untuk menarik minat pelancong (Respondent no. 8).

Respondent no.13 is also a member of MEKAR group. He expressed strong hostility to gill nets. At the same time, he articulated the expectations for egg consumption:

Penyu kurang kerana ia sudah banyak mati oleh sebab pukuk-pukuk pari, dia menghalangi penyu-penyu naik ke pantai. Pukuk itu dia letak berhampiran dengan pantai, jadi penyu itu dihalang oleh pukuk itu. Pukuk itu kalau kena penyu mati, pukuk lain tidak apa-apa. Pukuk pari sahaja. Tiada kesan lain. hanya pukuk sahaja.(Respondent no. 13)

Memang ada kebaikan, kalau penyu bertelur kita pun boleh makan telur nya.Sekarang telur penyu mahal, ada sikit-sikit kerajaan mahu ternak membiak, kalau penyu banyak dia lebih membiak ramai penyu hasil terulnya kita boleh makan. Sekarang sudah beberapa lama kita sudah tidak makan telur penyu (Respondent no. 13).

Table 6.1: Typology of Fishermen concerning to Community-Based Conservation.

	Expectation for egg consumption		
		Yes	No
Willingness for engagement	Yes	Type 1 (Active consumer)	Type 3 (WWF's goal; Active preservationist)
	No	Type 2 (‘Freeloader’)	Type 3 (Apathy)

Table 6.1 above presents a typology of fishermen. WWF expects fishermen, especially those who are members of the MEKAR group, to be Type 3. However, the respondents introduced here can be classified into Type 1 or Type 2. While Respondents no. 8 and no. 13 participated in sea turtle conservation as the members of the MEKAR group, their motivation is different from the original intention of the WWF. Fishermen who are eager for greater egg consumption and depend completely on the efforts of other parties can be called ‘freeloaders’.

This typology proposes the two tasks of the MEKAR group activity. Firstly, how to deal with the expectation for egg consumption. Second, how to overcome

dependency on *someone else* to do the work, an attitude which hampers the fostering of ownership amongst the local community.

6.2.3.2 Indifference with community-based programme

The next topic covers the factors preventing fishermen from participation in community-based conservation efforts. The concepts discussed here are as follows: *partial success, evasion, improper target, only on one beach, and pile of meetings.*

Partial success is a fishermen's attitude to suspend the clear evaluation on the achievement of the Ma'daerah project. *Evasion* is a tactic of fishermen who are less interested in the conservation programme. While none of fishermen in the community explicitly show hostility against conservation as previously mentioned, several fishermen purposely shun these conservation programmes. There are three concepts to explain the unpopularity of the program: *improper target, only on one beach, and pile of meetings.* The first two keywords are pertaining to the lack in tangibility of the programme whilst the latter pinpoints to its operation. These concepts are examined in this section one by one.

The community-based activity does not face serious antagonism. However, some members of the MEKAR group chose to suspend their participation. According to them, the project is a *partial success*:

Buat pada masa sekarang ini, kira berjaya atau gagal tidak itu kita tidak boleh nak fokus presen kah, tapi ingat 50-50. Tapi persatuan ini sedang usaha untuk menarik lagi minat orang kampung untuk memberi kerjasama untuk kebaikan penyu ini (Respondent no. 8).

Another respondent vividly described the situation of village programmes:

Beri kempen, membuat perjumpaan, dan rata-rata dan di mana-mana atas tujuan melindungi. Dia sudah buat perjumpaan, buat dialog, sudah pun buat roadshow tetapi sudah pun nelayan-nelayan tertentu tidak mahu dengan sengaja tidak mahu, dia faham, dia nampak atas tujuan itu. Tetapi jawapan nya dia tidak sengaja mahu menghindarkan, tidak mengambil tahu, dia seperti biasa menjalankan nelayan. Maksudnya tidak mahu mengambil tahu langsung. Ada setengah sahaja, itu kepentingan dia, mengambil pencarian Rahayu dia, kalau hindah masalah penyu, dia menjadi masalah (Respondent no. 3).

Evasion of conservation program such as this is a common tactic amongst those who are less sympathetic to conservation.

This indifference evokes a question: Why do fishermen feel indifferent towards conservation efforts whilst at the same time, they feel empathy for sea turtles? Three concepts emerging from interviews explain the reason. Firstly, fishermen consider the programmes conducted in villages to be directed to *improper targets*:

Memang kawalan ada sokmo. Kalau nak kira dia memang mari ceraman sokmo. Tetapi dia ceraman mengenai orang yang tidak menguna dengan pukot kokot, yang pukot kokot tu memang orang luar, orang Pahang, orang Johor (Respondent no. 1).

Fishermen attribute the sea turtle decline to be mainly caused by powerful outsiders.

In their opinion, they view themselves as victims rather than culprits. In line with these findings, conservationists should concentrate on managing the operations of large commercial boats rather than small boats from fishing villages. Moreover, the fishermen feel that they have already been given sufficient awareness on both the endangered status of turtles and the hazards of gill nets. Contents of educational programmes and dialogue sessions are nothing new to them. Respondent no.22 explained this point in detail:

Kalau aktiviti yang sama, contohnya ini hari saya tolong pantau, tolong tengok bagi maklumat, information kenapa penyu kawasan Kerteh ini terdapat, terdampar di pantai sudah mati berapa ekor. Apa sebab dia mati tolong beri maklumat kita sudah beritahu membuatkan apa dia mati sebab dia ikat tali, dibunuh ataupun ada sebab-sebab tertentu jadi hari-hari tak ada kes seperti itu. Saya tak tahu mungkin ada satu kali, dua tahun mungkin ada satu kali bukan hari-hari ini tragedi boleh berlaku, sangat kurang dan sangat jarang, sekali-sekali ada kena pukuk (Respondent no.22).

Next month, lain bulan pun tanya itu. Meeting lain bulan pun, meeting lain tahun pun itu juga. Tidak ada yang luar biasa, tidak ada yang baru, jadi kita tidak ada sebarang aktiviti lah (Respondent no.22).

Idea of *only one beach* shows a great similarity with that of *improper target*.

Fishermen are sceptical of the outcome of the conservation programme held in one geographically limited sanctuary alone.

Bagi pihak tumec tidak ada pemantauan bagi pihak MEKAR ambil tindakan tetapi tidak membuat, oleh kerana sekadar pantai sahaja (Respondent no. 3).

The scepticism roots in recognition that conservation programmes in the village would hardly solve actual problems even if the programme were to successfully win the hearts of villagers.

Another criticism against community-based conservation is *pile of meetings*. It criticizes that community-based conservation is not practical because its main activities seem to be meetings and lectures. This criticism results from insufficient understanding about the concept of community-based conservation. While it stresses on consensus-building and requires many sessions with community members, fishermen regard these meetings as time-wasting. Ironically, the mangrove planting programme, held by another environmental NGO called Eco-Care, serves as catalyst to form the less than ideal impression of sea turtle conservation:

Sepanjang penglibatan saya di dalam Eco-care, bukan Eco-care, persatuan MEKAR WWF nya kurang aktiviti. Banyak kurang aktiviti. lebih kepada meeting, maka saya terpaksa tarik diri. Itu untuk saya. Jadi meeting-meeting, kerja kurang. Aktiviti kurang (Respondent no.22).

Tentang membuat pelbagai-pelbagai projek, tapi tak nampak hasil. Bagi saya tidak mendatang, kurang mendatang memahaman, tidak seperti mana Optima Eco-care. Lebih kepada aktiviti. Walaupun kita ada basan turun ke sungai, basan, lumpur, kotor, tapi kita seronok. Kita dapat lakukan bersama. Semua yang melibat, kalau diberitahu ini hari ada program, kita

tak takut kotor, tak takut hujan, tak takut panas, tak takut susah, kita beri masa tertentu, cakap nak buat gotong-loyong, cakap nak tanam pokok, cari pokok dan mantau poko dan aktiviti-aktiviti lain kita sama-sama (Respondent no.22).

According to the respondent no.22, Mangrove planting attracts fishermen for several reasons - it places emphasis on the merit of fishery resources by stressing the role of mangroves as an incubator of fish juveniles¹²³. It also underlines the role of mangroves as a buffer against tsunami events. In addition, fruits of planting activity are explicit because planted trees grow rapidly. In comparison with the mangrove project, the turtle project may well give fishermen a less than practical impression. Its results will be proved only after several decades while its idea of a grass-roots management so far has resulted in a *pile of meetings*.

In short, *improper target*, and *only on one beach* represent scepticism of fishermen concerning the tangibility of community-based conservation efforts. A *pile of meetings* highlights their lack of familiarity with the concept behind the project.

6.2.3.3 Presence of the government

The majority of the fishermen interviewed consider the government as the only party who should take charge of sea turtle conservation by controlling the use of illegal gears and by running hatcheries:

¹²³ Description on the mangrove planting on this paragraph is based on interview with Mr Ramlee, the head of fishery association in Kerteh. He has cooperated to mobilise local fishermen into both the mangrove planting and community-based sea turtle conservation.

Pihak perikanan memantau nelayan yang pukat pada 10 inci terus menahan (Respondent no. 9).

Masalah tidak ada apa-apa, setakat ini kira belum ada apa kira lepas, dia dok care maknanya menda tu dia lepas (Respondent no. 16).

Some fishermen consider that *more stringent control on fishing gears* is the solutions to counter sea turtle decrease. They support the tightening of regulations on trawlers especially due to their *sense of victimization* caused by them. Trawlers are also *harmful for fishery resources*, yet *powerless fishermen* cannot take adequate action. Naturally, they expects the government to tackle this problem:

Menambah memang boleh tetapi pemantauan itu lebih meningkat kan daripada jabatan, Jabatan Perikanan, kawalan yang lebih (Respondent no. 3).

Kalau semua pihak ini jabatan-jabatan yang punya kuasa, baru boleh. Kalau kita tak boleh. Sebagai volunteer, sukarela tak boleh. Malah, ada pergaduhan (Respondent no.22).

Dia buat kawasan larangan dari darat pukat tidak boleh diguna, pukat kokot tidak boleh, pukat pari tidak boleh (Respondent no. 12).

Fishermen also welcome *larger hatcheries*; especially those who collect and consume eggs, with the expectation of greater harvest in future:

Untuk mendapatkan tambahan bilangan penyu, maknanya saya rasa lah untuk lebih buka lagi kawasan penyu itu ada untuk penyu itu naik untuk

tempat menjadikan tempat Ram-ram. Iaitu penetasan, makna tambah lagi selain daripada makna kalau ada tempat tempat lain kalau ada untuk buka lagi lah tempat itu (Respondent no.7).

Yang penting, saya tadi cerita orang paling penting ialah jabatan-jabatan tertentu. Menambah, meluas, dan memperbesarkan dia punya, apa, pemantauan. Dari pantai sampai laut. Itu penting (Respondent no.22).

The support for hatcheries comes with the expectation for ‘faedah’, or a form of tangible benefit, in the future. The expectation for the greater harvest of eggs leads them to accept management, regardless of their level of awareness on the value of a rare species. It is also a comfortable idea for them that hatchery operations are the *work of government* conducted by public servants; condoning their ‘freeloader’ behaviour. Ironically, the great presence of the government as a result of its devotion for the past few decades has transfixed the mindsets of fishermen to view sea turtle conservation as the *work of government* whose responsibilities include hatchery operations and head-starting. This notion is clear in the following statements of MEKAR group members:

Projek perlindungan penyu ini oleh MEKAR dan TUMEC ini saya rasa berjaya lah sebab dia ada kan satu rumah untuk benih-benih penyu itu untuk mendapat kan anak. Saya rasa berjaya lah (Respondent no. 7).

Ini kalau kata nak dapat faedah tindakan penyu menetas kita untuk komuniti rakyat Malaysia sebab itu kerajaan persatuan buat tempat penyu untuk menambahkan anak-anak penyu untuk menambah lebih banyak lagi (Respondent no. 8).

The first statement regrettably trivializes the Ma'derah project. The understanding of that particular respondent (Respondent no. 7) in terms of conservation is that the function of MEKAR group is merely for incubating eggs. The second respondent sees the government as the party in charge while he describes the community as the recipient of benefit. These statements articulate the fishermen's perception on community-based conservation.

An important point to note in these arguments is the *trust for government* as a result of the steady governance in the country¹²⁴. This trust manifests itself well on the understanding of fishermen with regards to the relationship between the petrochemical industry and turtle decrease:

Kalau bahaya sekadar daripada punca daripada kesan-kesan minyak itu, tidak terlalu serius sebab kerajaan juga memantau, kerana kerajaan Malaysia juga memantau secara bagaimana membuang sisa-sisa toksik untuk mendatangkan bahaya kepada hidupan laut, orang kata itu bukan sahaja penyu, semua hidupan. Kalau ada cecairan daripada sisa-sisa toksik seperti kotoran minyak dan sebagainya, bukan sahaja penyu itu malah kita manusia juga datang keburukan (Respondent no.21)

The presumption of the citation above is belief in the capability of the government to solve these problems effectively. Criticism against foreign crude oil carriers cited in

¹²⁴ Although there is political competition between the national alliance, the ruling party, and Islamic party in the east coast of the peninsular, disputed issues tend to concentrate on religious matters and performance of poverty reduction. Hence, as far as conservation issues concerns, legitimacy of the government remains unquestioned.

earlier parts share this presumption. A number of fishermen even consider the government to be responsible in bearing all responsibilities pertaining to conservation. Consequently, they blame the decrease in nesting numbers on the insufficient performance of the government:

Ada lah, makna pendapat masalah itu ada lah contoh orang perikanan lah. Masalah penyu mati dia lah yang bertanggungjawab (Respondent no. 16).

Perikanan akan bertanggungjawab benda ini, dia akan sampai masa dia menetas dia akan lepas ke laut lah. Yang sebab penyu kurang ini dia ada sebab-sebab (Respondent no.17).

The usage of the word, ‘tanggungjawab’, is worth an argument. In the context of the second citation, the word refers to full responsibility in managing sea turtles. However, in the argument on *irresponsible fishermen*, ‘tanggungjawab’ only refers to compliance with regulations posed on fishing gears. This difference of usage reveals that, under the perceptions of fishermen, the government is the prime actor for conservation. Concerning sea turtle conservation, fishermen should only comply with the given rule; the more active and difficult conservation efforts falls are seen as being within the *work of government* scope.

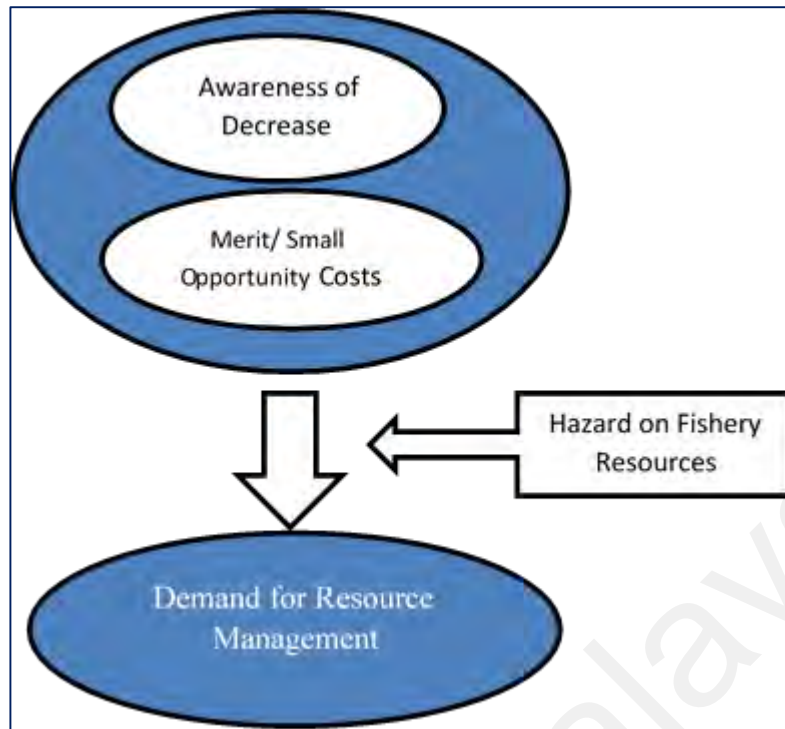


Figure 6.2: Mental Scheme of the Demand in Resource Management

The arguments portrayed in this study are divided into two figures. Figure 6.2 above represents the process. As long as fishermen expect materialistic value from sea turtles, they support management activities - expecting greater egg harvests in the future. At the same time, the local fishermen have demanded for tighter management of fishery resources as trawlers pose a threat to their subsistence.

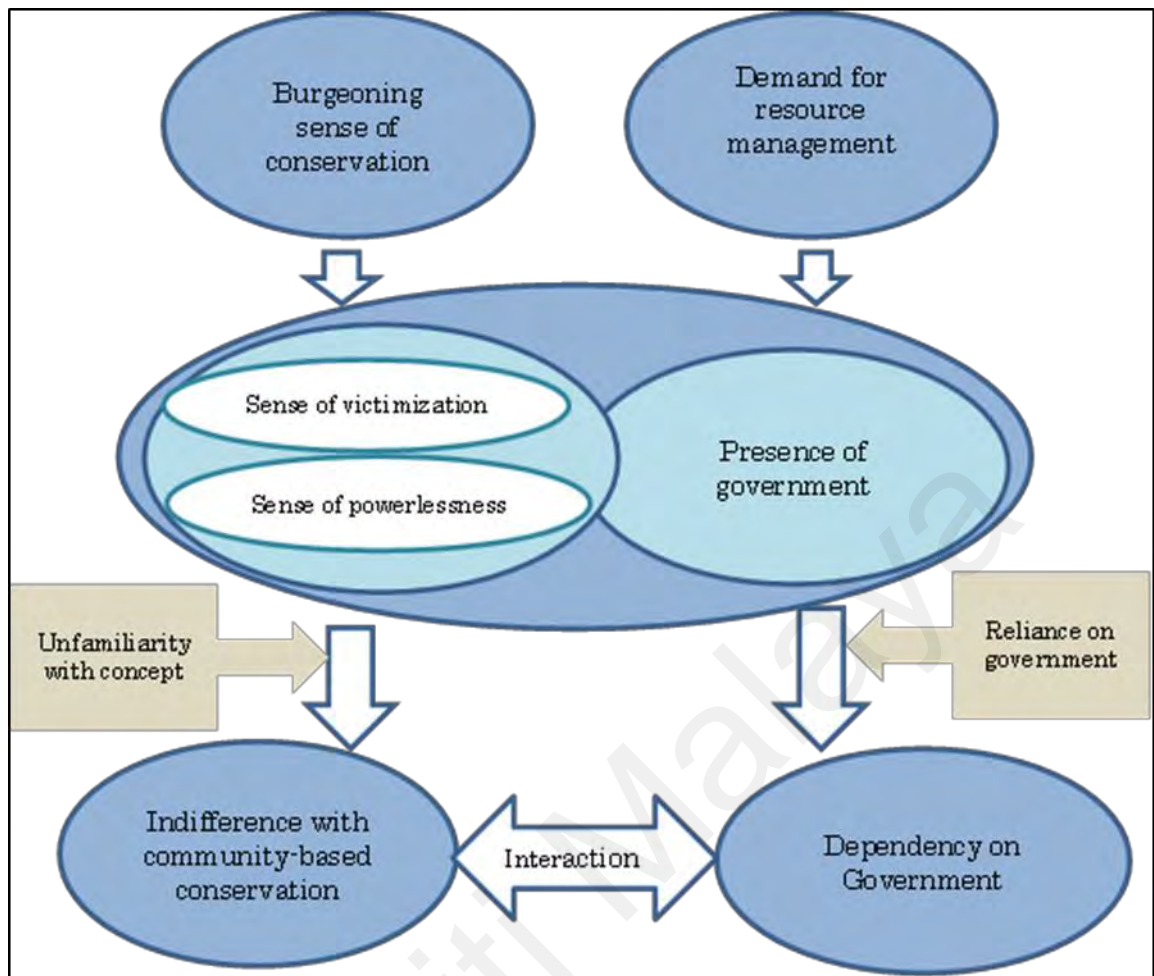


Figure 6.3: Mental Scheme of Preference on Managing Actors

The process presented on the left side of the figure shall be reviewed here. Even though the issue of conservation has burgeoned amongst fishermen, a sense of victimisation, feeling powerless, and the great presence of the government have impeded the development of such feeling. These factors trigger a sceptical attitude towards community-based management. This sceptical feeling is amplified by their unfamiliarity with the concept of community-based conservation; *piles of meeting* seem to be unpractical for them.

Next, the right side of the figure is reviewed. As discussed, fishermen demand effective fishery resource management; fishery resources here include sea turtles. The sense of victimisation, feeling powerless, and the great governmental presence are channeled into their dependency on the government. Being very reliant on the government strengthens this feeling of dependency.

In addition, the scheme assumes the interaction between the indifference with community-based conservation and dependency on the government. The effect of both these attitudes is amplified when they are combined.

6.2.4. On egg consumption

This subsection reviews the justification of turtle egg consumption. The demand for eggs has always overshadowed the previous discussions. Interviews have revealed the logic of fishermen in justifying their egg consumption. It also illustrates how past practices of the conservancy have affected the viewpoints of fishermen.

6.2.4.1 Leaving eggs – a voluntary effort

Leaving eggs refers to the custom of turtle egg collectors to voluntarily avoid harvesting all the nested eggs. This is the simplest way to justify egg harvesting amongst fishermen, even though this custom does not actually save turtles considering only a small percentage of hatchlings reach adulthood. Respondent no.1 mentioned as follows:

Tapi cara orang ambil telur memang sekarang ini kerajaan pelihara penyu bertelur sepuluh biji lima biji mesti dia tinggal untuk anak (Respondent no.1) .

A question that emerges here is whether or not fishermen are aware of the low survival ratio of hatchlings. The following remark of the informant suggests that he is aware of this small percentage:

Kalau sekarang seratus seekor je hidup. Mungkin saya rasa kalau lah besor itu mungkin lah dia kata lima ekor je hidup (Respondent no. 1).

A fishermen can tactically claim his innocence regardless of his actual knowledge. As this respondent had mentioned, leaving a few eggs in a nest can be used as an excuse for an egg collector to continue his turtle egg collection practice. The number to be left behind would depend solely upon the decision of a collector. In this regard, another respondent expresses his scepticism regarding this custom:

Bila ada telur ada juga yang tidak menetas, tapi dia tinggal juga telur satu biji, dua biji, tetapi tak banyak. Boleh jadi penyu kurang lah (Respondent no. 15).

The argument above suggests that the provision of biological knowledge does not automatically lead to successful conservation as some conservationists have imagined as egg collectors are more tactical.

Selling eggs to hatcheries is a variation of *leaving eggs*. It furnishes a stronger sense of legitimacy to fishermen than *leaving eggs* in the nests does:

Kekurangan itu fasal orang makan telur itu kita dok ri, bukan semuanya telur itu orang makan, yang lain itu dia biak-biak lah (Respondent no. 16).

Betul orang kampung ada makan penyu, tetapi ada had, ini untuk membiakan ianya sebahagian untuk dijual (Respondent no. 17).

By selling eggs to government hatcheries, the fishermen can leave the rest to the government.

6.2.4.2 Existence of hatchery

Fishermen have also mentioned the *existence of hatchery* as a justification of egg consumption. If hatcheries are successful, it should compensate the egg consumption sooner or later. Even if hatcheries hardly compensate egg harvest, this only means that there is an insufficient performance of *work of government*, for which the only solution is improving the performance.

Most fishermen depict the performance of hatcheries to be high enough. Some fishermen even consider the existence of hatcheries to automatically prove the success of conservation efforts; without considering their performance.

Program penyu ini berjaya. Sebabnya anak-anak penyu sudah ada
(Respondent no. 5)

*Fasal dia bertelur. Dalam satu bulan satu kali dia lepas membiak. Jadi
bilangan banyak lah* (Respondent no. 11).

Interestingly, Respondent no.5 and no.11 respectively replied to a question ‘What do you think is the benefit of sea turtles to us?’ as follows:

Telurnya boleh dimakan kepada orang-orang kampung (Respondent no.5).

Ada faedah keada kita. Boleh makan telur ah (Respondent no. 11).

They would not hesitate to consume the eggs because of their optimism for success of hatcheries. Their statement represents how the existence of hatcheries unintentionally aggravates turtle egg consumption.

On the other hand, several fishermen have criticised the lack of performance of hatcheries. In their opinion, head-starting is wasteful:

*Masalah, memang masalah lah, kalau dia buat cara macam
sekarang memang masalah, masalah penyu ini memang membazir jer*
(Respondent no. 1)

*Tidak ada keistimewaan buat cara mana pun habis berjuta-juta pun
bialkan penyu ini tidak ada dapat hasil pun tidak ada kesan lah.... Pupus
macam... fasal apa? Anak mati habis* (Respondent no. 1)

Untuk pandangan saya lah, masalah memang ada lah maknanya perlindungan penyu ini anak-anak penyu, sebab apabila tetas anak penyu yang baru-baru inch besar kita lepas mungkin penyu itu tidak akan hidup seratus peratus sebab anak penyu itu akan di makan oleh ikan yu, ikan besar, jadi adalah sikit-sikit yang hidup jadi begitu lah masalah jugak lah (Respondent no. 7)

None of these complaints, however, proposed the abolishment of hatcheries. They merely proposed for technical improvements. As long as fishermen see that hatcheries continue increasing the turtle nesting numbers, which eventually lead to a drop in turtle egg prices, they will keep supporting their practices. Their only concern is that hatcheries may not function enough to underpin the harvesting activities in the future.

A point that should not be overlooked is that the perception of these fishermen faithfully mirrors past practices of resource management of the Department of Fisheries in the recent decades. Its core components are the research carried out in experiment stations and the crackdown over fishing gears. The fishing community has not played an active role in these activities for a long time. Consequentially, even after experiments to introduce a community-based management for several years, the fishermen still tend to abide by the role with which they are already familiarised with.

6.2.4.3 Official authorization

Another question emerges here: Do fishermen feel guilty for collecting and consuming

eggs? In the opinion of the author, the answer is clearly 'No'. Their awareness on the hazards of turtle egg consumption is astonishingly low, compared to their *awareness on hazard* of particular fishing gear. While every respondent mentioned the harm caused by trawlers or gill nets on sea turtles, few mentioned the negative impact of turtle egg consumption. A crucial difference between using gill nets and collecting eggs is obvious - the former is illegal whilst the latter is legal. Turtle egg collectors have obtained *official authorization* under the licensing system:

Dahulu kerajaan mendapati ini kawasan penyu, ini dia panggil 'pejak'. Kerajaan ini kawasan, tiap-tiap tahun berapa ribu-berapa ribu pun dia bayar ke kerajaan lah (Respondent no.8).

Penyu pada masa itu tujuan pihak berkenaan iaitu pihak perikanan dia ada macam peraturan. Contoh barang sesiapa yang ambil dia akan di tangkap polis dia pajak dari sini sampai pantai kemasik. Dia pajek beberapa ribu ringgit pulak jadi orang tidak boleh mencuri. Dia mencuri kena tangkap. Contoh dia boleh pajak harga dalam 5 ribu, boleh tak boleh pun dia akan jaga (Respondent no.15).

Turtle eggs have not been considered part of the 'commons' under the free-access system¹²⁵. The Government has systematically controlled its collection and fishermen have had to pay to get their licenses. The following anecdotes tell us how the licensing system started in villages:

¹²⁵ 'Commons' is a concept defined as the elements of the environment - forests, atmosphere, rivers, fisheries or grazing land - that are shared, used and enjoyed by all. The concept has widely used to explain environmental degradation of such places without particular custodian since Hardin expressed her concern in her essay, 'tragedy of commons' (Hardin, 1968).

Seperti orang kerja, orang Paka, dia selalu merebot penyu, telur penyu di kawasan kita (Respondent no. 6).

Kalau lah sekiranya sebelum itu tumec atau perikanan mengambil ahli, makna mungkin ada satu pergaduhan sebab ada yang kata mencuri dan sebab itu kerajaan dia keluar satu tender untuk tumec pengang kerajaan keluar satu tender kepada pemajak-pemajak supaya mengelak satu pergaduhan tetapi pergaduhan ini tidak lah begitu kerap berlaku (Respondent no. 7).

Paka mentioned in the first citation is a town located 14km north of the studied villages.

Inhabitants of three small towns: Paka, Kerteh, and Kemasik, had once crept into beaches of the other towns to acquire eggs and this evoked frequent conflicts¹²⁶. The anecdotes show that fishermen had already regarded the eggs on certain areas of beach as their exclusive resource at the time, and the government's control on beaches was not stringent enough. Regulations were eventually fortified to handle such disputes. This experience corroborates the fishermen's notion.

To summarise, the psychological mechanism concerning the hazards of fishing gears and that of turtle egg consumption fundamentally differ. Concerning fishing gears, the awareness of hazards and awareness on illegality interact to amplify each other. This does not hold true to turtle eggs; the state law does not enhance but instead abates the *awareness*

¹²⁶ This description is based on two resources: Interview with Ramlee, head of fishermen association of Kerteh and Kemasik and information from rangers in Ma'derah sanctuary. Two old rangers of the sanctuary, who were born and raised in Kampong Labohan, also informed several similar anecdotes.

on hazard of the fishermen.

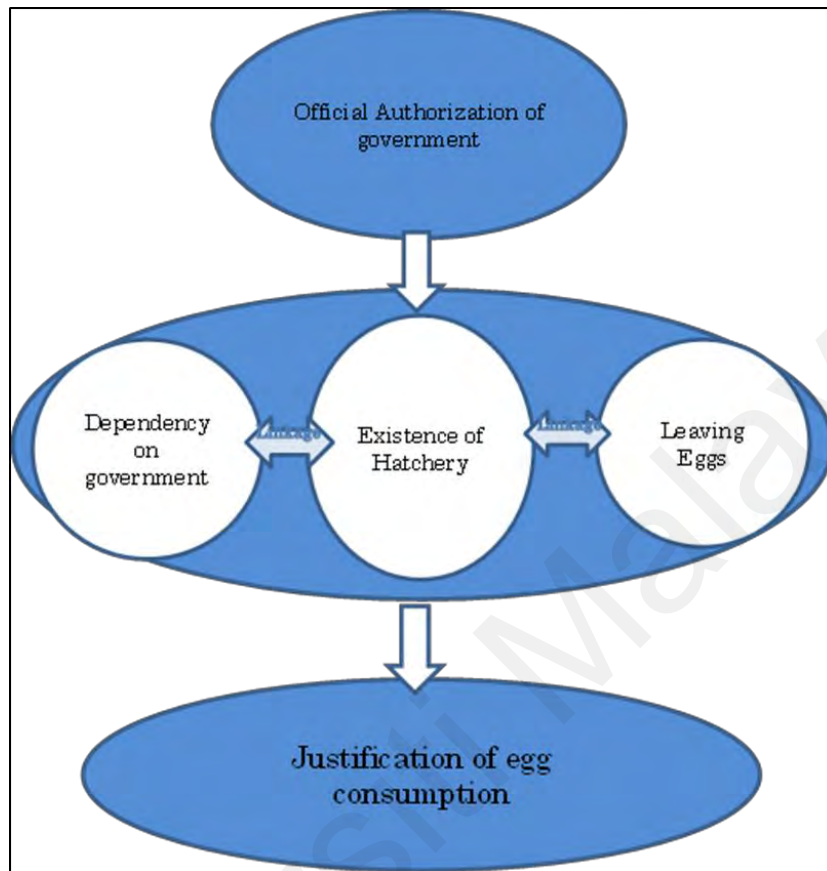


Figure 6.4: Mental Scheme of Justification of Egg Consumption

The discussions in this subsection can be summarized in Figure 6.4 above. *Official authorization* serves as the bedrock. The existence of hatcheries is the cornerstone to merge this subsection with earlier subsections. It relates with *dependency on government*. Behind this dependency, there exist a *sense of being victimised* and a *sense of feeling powerless* that hampers the feeling of ownership amongst fishermen. The *existence of hatcheries* is also linked with *leaving eggs*. Selling eggs to hatcheries is the important

variation to *leaving eggs*. As long as a hatchery exists, and the government is running it, fishermen do not feel compelled to worry about their consumption of turtle eggs. To them, *leaving eggs* is enough to show their compliance and anything more that that is considered the responsibility of the government.

Up to here, this section has mapped out the mentality of fishermen in general. Using quantitative techniques, the following sections will examine the hypotheses presented here.

6.3 Quantitative analysis

This section covers quantitative analyses, and aims to testify and elaborate on the findings of the previous section. Firstly, the section summarise distributions of personal attributes of the respondents. Secondly, it presents models based on the mental schemes presented in the previous section. Thirdly, it will conduct an Exploratory Factor Analysis (EFA). Factors identified here are used for the elaboration of the hypotheses obtained through the MGTA analysis. Fourthly, it examines the effects of personal attributes. Finally, it will testify the models initially presented. A Path Analysis technique will be applied for this purpose.

6.3.1 Attributes of respondents

This subsection scrutinizes the attributes of respondents and their effects on the

attitude of fishermen towards conservation. The section has mainly two purposes. First, it is to compliment the result of the previous chapter which did not present any hypothesis on the effect of personal attributes of respondents and their attitudes toward sea turtle conservation. Second, it prepares a multivariable analysis in by elaborating on the features of samples used for the analysis.

The section is composed of three subsections. The first two subsections are descriptive rather than analytical. The first subsection describes the distribution of the various attributes. The second subsection focuses on describing the profiles of the members of the MEKAR group, given the unique role of the group. Are there any differences, in terms of personal attributes, between members and non-members? The third subsection presents an analysis on the effects of personal attributes on the variables presented in the previous section. An analysis of variance (ANOVA) is employed to testify whether the effects are statistically significant.

6.3.1.1. Distribution

Table 6.2 below summarizes the attributes of respondents. More than 94 per cent of the respondents replied to Questions 1 to 5 whilst only 90 per cent of the respondents gave answers to Question 6. Each of these results are checked individually. 15 per cent of the respondents were under the age of 30, about 12.8 per cent were between ages 30 to 45, 45.7 per cent were between ages 46 to 60, and 24.2 per cent were over 60 years old.

Considering that more than half of the Malaysian population is under their thirties during the studied period, it is safe to say that the fishing village community is much older than most Malaysians in general.

Table 6.2: Distribution of the Respondents

	Under 30	31-43	45-60	Over 60	n.a.	
How old are you?	11	9	32	17	1	
	Kerteh	Others	n.a.			
Where are you from	60	6	4			
	Yes	No	n.a.			
Are you a member of MEKAR group?	14	52	4			
	A class owner	B class owner	Fiber class owner	Clew	n.a.	
What is your status in fishing activities?	11	6	39	13	1	
	Primary	Lower secondary	Higher secondary	Diploma or Higher Degree	Other	n.a.
What is your highest academic qualifications?	41	17	8		1	3
	Having a part time job	Having family members(s) working for the industry	Having no relationship	n.a.		
What kind of relationship do you have with oil and gas industry?	3	12	47	8		

In terms of place of origin, the number of fishermen born and raised in Kerteh accounts for 85.8 per cent. 25 per cent of the sample comprised of members of the MEKAR group. Considering that the number of members in the MEKAR group was approximately 300 as of 2007¹²⁷, and this sample covers almost 70 per cent of fishermen from the three main fishing villages in Kerteh, it is deemed that local fishermen account for 5 per cent (at most) of the members. Concerning the ownership of fishing boats, 55.7 per cent of

¹²⁷ Based on the interview with Mr. Amran, the chief of MEKAR group, in August 2007.

respondents owned fibre class boats. Further, the owners of A-class or B-class fishing boats were 15.7 per cent and 8.4 per cent respectively. In short, 79.8 per cent of respondents owned boats. The education level of the sample is obviously low. 58.5 per cent of them graduated from elementary school, and 24.2 per cent from lower secondary school. Only 11.4 per cent had completed higher secondary school. While only one respondent had obtained a diploma or college degree, the respondent noted that he had never graduated from any school (*tidak bersekolah*). 21.4 per cent of respondents' households earn part of their income from the oil and gas industry. 17.4 per cent of them have a family member working for the oil and gas industry, and 4.2 per cent have part-time jobs in the Kerteh petrochemical complex. Two thirds of the fishermen responded that they had no relationship with the industry (*Tidak ada apa-apa hubungan*).

6.3.1.2 Profile of MEKAR members

MEKAR group has been expected to play a core role in promoting community-based conservation. As repeatedly mentioned in previous chapters, inviting local fishermen to be members of the group has a special significance, provided that these fishermen are original members of the area and are the main targets for awareness-raising. A detailed profile of the members from fishery villages has not been revealed. The question is if there are any differences in tendency between members and non-members.

Table 6.3 shows that MEKAR fails to influence the youth despite its strong emphasis

on educational programmes at schools for nearly a decade. 85.7 per cent of its membership is over 45 years old and senior citizens account for 42.9 per cent. As presented in Table 6-4, no apparent difference was observed in terms of educational level between members and non-members. Nearly two-thirds of members had only graduated from elementary school and only one member completed his study in upper secondary school. Furthermore, against the projection of the author, membership does not relate with the oil and gas industry. In essence, almost all members (13 of 14 members) have no relationship with the industry. All members were born and raised in Kerteh and have their own boats.

The Chi-square tests on the relationship between membership and personal attributes underscore that the generation, educational background, place of birth, boat ownership, and relationship with the oil and gas industry are all statistically-independent from membership of the group.

Table 6-3a: MEKAR Member's Profile (by Generation)

	Member	Non-member
Under 30 years old	1	9
30-45 years old	1	8
46-60years old	6	25
Over 61years old	6	10
n.a	0	0
Total	14	52

Table 6-3b: MEKAR Member's Profile (by Educational Level)

	Member	Non-member	n.a
Elementary school	9	31	1
Lower secondary school	4	12	1
Upper secondary school	1	6	1
Diploma or above	0	0	0
Others	0	1	0
n.a	0	2	1
Sum	14	52	4

Table 6.4: Statistical Test of Independence on MEKAR Membership and Other Personal

Attributes of the Respondents

	Chi-Square value	Degree of freedom	p-value	Result
Generation	3.91	3	0.27	Independent
Place of birth	1.49	1	0.22	Independent
Educational level	0.62	3	0.89	Independent
Boat ownership	8.93	4	0.06	Independent
O&G industries	1.34	2	0.51	Independent

6.3.2 Modelling

The main findings of the qualitative research can be summarized as points 1 to 8.

The first three points as shown below are positive factors for conservation:

1. Local fishermen have a certain degree of affinity towards sea turtles.
2. Local fishermen are strongly concerned about the degrading fishing grounds.

Consequently, they support resource management.

3. Most fishermen consider the opportunity costs of sea turtle conservation to be small enough.

On the other hand, the study found three psychological barriers preventing fishermen from active participation in conservation activities. These factors would hamper the sense of ownership especially - a necessary trait for successful co-management:

4. Local fishermen see themselves as victims of mindless actions of powerful outsiders.

5. Local fishermen do not consider themselves powerful enough to clamp down on such outsiders.

6. Fishermen consider conservation to be the work of experts from outside.

The government in particular are regarded as the only party which is suitable for conservation.

The study also determined several notions regarding turtle egg consumption and these ideas are thought to offset the effect of campaigns that aim to curb turtle egg consumption.

7. Fishermen assume that the government has officially vested them to collect turtle eggs under licensing system.

8. The existence of government hatcheries give the fishermen ideas that sea turtles are successfully replenished to compensate for their consumption.

These findings are compared with the findings of previous studies that were introduced in Chapter 2 and Chapter 3. Figure 6.5 illustrates the ideal type of community-based conservation. Programmes offered by conservation NGOs improve environmental awareness as well as the feeling of ownership. Environmental awareness results in villagers' wishing to protect the species and a sense of ownership enhances their voluntary participation in conservation practices.

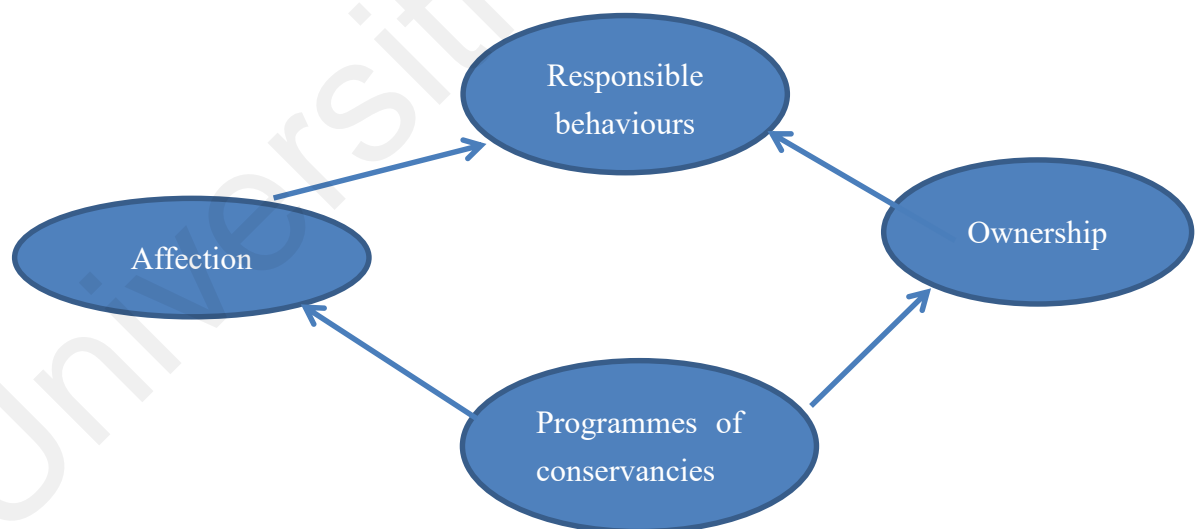


Figure 6.5: Ideal Community-Based Conservation Model

Legend: Solid arrow indicates positive correlation

The model above can be also expressed by the following equations:

$$A = \lambda_i P + \gamma_i \quad \cdot \cdot (1)$$

Where

A : Awareness P : Programmes of conservancies

γ : Residual errors

$$O = \lambda_{ii} P + \gamma_{ii} \dots (2)$$

Where

O : Ownership P : Programmes of conservancies

γ : Residual errors

$$R = \lambda_{iii} A + \lambda_{iv} O + \gamma_{iii} \dots (3)$$

Where

R: Responsible behaviour A : Awareness

O : Ownership γ : Residual errors

Literature reviews shown in Chapter 3 depict conservation projects to not flow smoothly due to opportunity costs. It is assumed that such projects may hamper local businesses, restrict the subsistence of a particular group, and even increase threats to life of the local community - Figure 6.6 illustrates this idea. While awareness and a sense of

ownership positively affect conservation, the opportunity cost contributes to the negative impacts. If the opportunity cost is too large, it offsets the positive effects from factors such as awareness and ownership. Therefore, the mitigation of opportunity costs is deemed to be one of the most vital clues for a successful conservation programme.

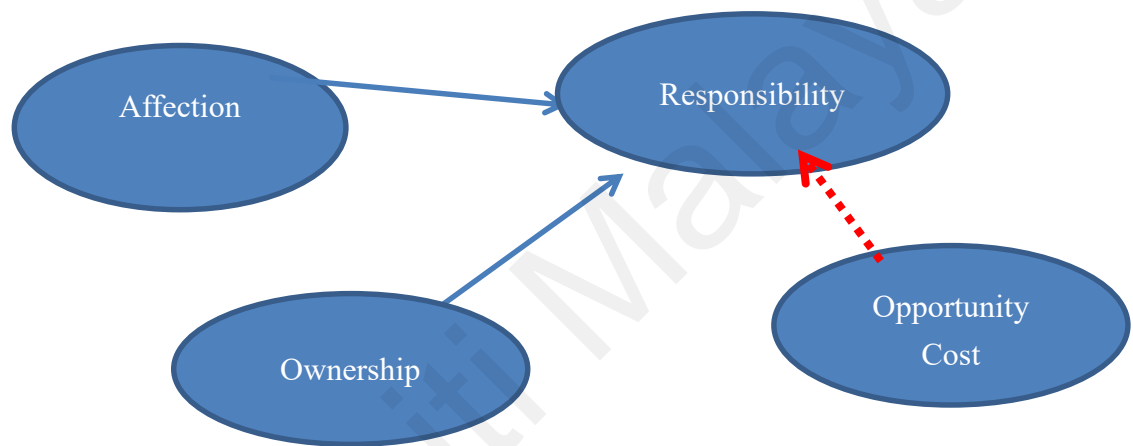


Figure 6.6: Opportunity Cost Model

Legend: Solid arrow indicates Positive correlation

Dotted arrow indicates Negative correlation

This model can be simply expressed in the following equation:

$$R = \lambda_i A + \lambda_{ii} O + \lambda_{iii} OC + \gamma$$

Where

R: Responsible behaviour O: Ownership

The study further proposes to take several more factors into consideration, based on the interview conducted in the studied villages. Factors such as a sense of being victimized and the dependency on the government are likely to hamper the sense of ownership amongst local fishermen. Fishermen are also unlikely to voluntarily address the issue of turtle egg collection as they feel that they are being legally questioned. Figure 6.7 presents the proposed model to explain the present status in Terengganu.

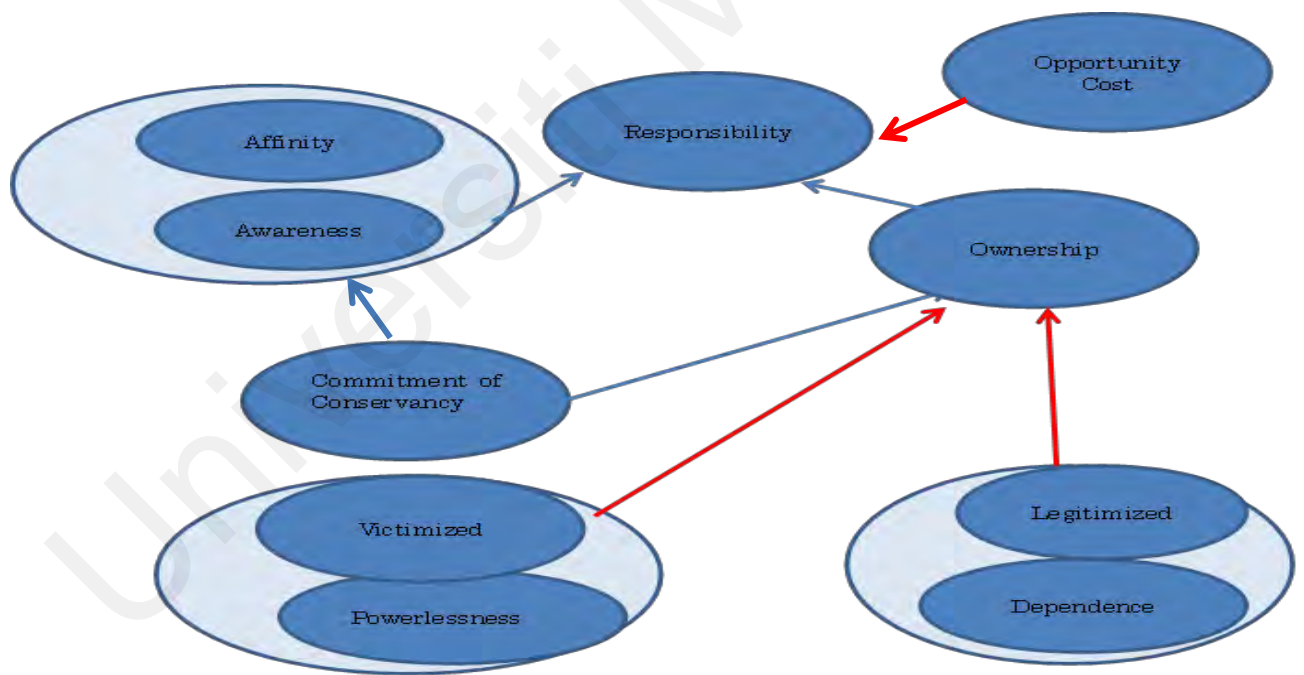


Figure 6.7: Terengganu Model (Estimated)

Legend: Solid arrow indicates Positive correlation
Dotted arrow indicates Negative correlation

This model can be expressed in the equations below:

$$R = \lambda_{i1} A + \lambda_{i2} O + \lambda_{i3} OC + \gamma_i \quad \dots (1)$$

Where

R: Responsible behaviour O: Ownership

OC: Opportunity Cost γ : Residual Error

$$A = \lambda_{iii1} P + \gamma_{iii2} \quad \dots (2)$$

Where

A : Awareness P : Programmes of conservancies

γ : Residual errors

$$O = \lambda_{iv1} P + \lambda_{iv2} D + \lambda_{iv3} V + \gamma_{iv4} \quad \dots (3)$$

Where

O : Ownership P : Programmes of conservancies

D : Dependency V : Sense of victimisation/ Sense of powerlessness

These models are to be examined in the latter section of the chapter.

6.3.3 Exploratory Factor Analysis

As discussed in Chapter 3, the Modified Grounded Theory Approach (MGTA) is one of the ways to reveal the latent factors, referring to concepts from qualitative data

collected such as interview records. It also presents models called schemes that explain the relationships amongst the determined factors. Exploratory Factor Analysis employed in this section is a method to identify latent factors from quantitative data. Therefore, the two methods are similar in terms of purpose and modality. The author performs a quantitative analysis here in view of this similarity. The factors drawn from the analysis will eventually be compared with the concepts presented in the previous chapter.

The Exploratory Factor Analysis in this section will be conducted under conditions below:

4. The study adopts promax rotation, which assumes interaction between the factors.
5. Factors are adopted until the extraction sums of the square loading exceed 60 per cent.
6. The threshold value for the minimum factor loading is 1.0¹²⁸.

After 41 rotations, the author obtained a convergence. In accordance with criteria 3, the author chose 7 factors for the interpretation. The extraction sum of the square loading was 62.04 per cent, fulfilling the second criterion. The factor loading of the 7th factor is 1.08,

¹²⁸ This criterion is known for “Kaiser Criterion”. The Kaiser rule is to drop all components with eigenvalues under 1.0 - this being the eigenvalue equal to the information accounted for by an average single item (Kim and Muller, 1978; 48-49).

which satisfies the third criterion.

The score of Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.79.

Bartlett's test of sphericity gave a score of .00. Therefore, the null hypothesis is rejected.

Factor Analysis is applicable to this data.

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Table 6.5: Descriptive Statistics for Items Adopted to Factor Analysis

Items	Number	Unbiased Variance	Mean	SD
Perbuatan mengambil telur-telur penyu secara berleluasa adalah lebih baik dihentikan.	71	1.160	2.519	1.077
Adakah anda setuju bahawa nelayan yang gunakan pukot pari bertanggungjawab mesunahkan penyu	71	1.044	2.556	1.022
Nelayan-nelayan yang menggunakan pukot pari mesti dikenakan hukuman yang berat.	71	0.995	2.796	0.998
Nelayan-nelayan tempatan bertanggungjawab untuk menjaga kawasan penangkapan ikan.	71	0.534	3.352	0.731
Nelayan-Nelayan sepatutnya melibatkan diri dalam perbincangan tentang program pemuliharaan penyu	71	0.476	3.426	0.690
Ceramah tentang penyu adalah memberi banyak pengetahuann dan menarik	71	0.488	3.241	0.699
Kerajaan semestinya bertanggungjawab untuk memulihara penyu	71	0.442	3.537	0.665
Telur-telur penyu ialah hak milik nelayan tempatan	71	1.159	2.537	1.077
Hasil penjualan telur penyu adalah lumayan	71	0.959	2.722	0.979
Nelayan menggunakan pukot pari kerana hasil tengkapan adalah lumayan	71	1.163	2.685	1.079
Penyu mengganugu operasi penangkapan ikann oleh nelayan-nelayan tempatan	71	0.997	2.056	0.998
Penyu akan miningkatkan bilangan pelancong yang datang ke sini	71	0.368	3.481	0.606
Usaha melindengi penyu adalah penting	71	0.480	3.463	0.693
Pemeliharaan alam sekitar adalah penting	71	0.254	3.519	0.504
Pemeliharaan kawasan penangkapan ikan adalah penting	71	0.405	3.481	0.637
Penyu semakin berkurangan kerana perbuatan nelayan-nelayan dari negara jiran	71	0.921	3.056	0.960
Penyu semakinn berkurangan kerana penggunaan pukot tunda	71	1.067	3.093	1.033
Penyu berkurangan kerana oerbuatan orang-orang kampung di sini	71	0.553	1.889	0.744

Table 6.6: Result of Factor Analysis on the Attitudes of Fishermen with regards to Sea Turtle Conservation.

Factors			Eigenvalue	% Variance explained	Cumulative per cent	Cronbach Alpha
Importance			3.5466	19.70%	19.70%	0.78
	Penyu akan meningkatkan bilangan pelancong yang datang ke sini	0.78				
	Usaha melindengi penyu adalah penting	0.71				
	Pemeliharaan alam sekitar adalah penting	0.65				
	Pemeliharaan kawasan penangkapan ikan adalah penting	0.53				
Cause			1.8466	10.30%	30%	0.67
	Penyu semakin berkurangan kerana perbuatan nelayan-nelayan dari negara jiran	0.90				
	Penyu semakin berkurangan kerana penggunaan pukut tunda	0.85				
	Perbuatan mengambil telur-telur penyu secara berleluasa adalah lebih baik dihentikan	0.54				
Law-abiding			1.5996	8.90%	38.90%	0.61
	Kerajaan semestinya bertanggungjawab untuk memulihara penyu	0.88				
	Adakah anda setuju bahawa nelayan yang gunakan pukut pari bertanggungjawab mesunahkan penyu	0.63				
Participation			1.2959	7.20%	47.10%	0.69
	Nelayan-nelayan tempatan bertanggungjawab untuk menjaga kawasan penangkapan ikan.	0.88				
		0.67				
Economic Interest			1.0379	5.78%	51.82%	0.57
	Nelayan menggunakan pukut pari kerana hasil tengkapan adalah lumayan	0.66				
	Pemeliharaan kawasan penangkapan ikan adalah penting	0.58				
	Telur-telur penyu ialah hak milik nelayan tempatan	0.49				
Mis-capture			0.9769	5.40%	52.50%	0.61
	Penyu mengganugu operasi penangkapan ikann oleh nelayan-nelayan tempatan	0.70				
	Penyu berkurangan kerana oerbuatan orang-orang kampung di sini	0.65				
Guilty-feeling			0.7446	4.20%	56.70%	0.6
	Nelayan-nelayan yang menggunakan pukut pari mesti dikenakan hukuman yang berat.	0.79				
	Adakah anda setuju bahawa nelayan yang gunakan pukut pari bertanggungjawab mesunahkan penyu	0.47				
	Nelayan-Nelayan sepatutnya melibatkan diri dalam perbincangan tentang program pemuliharaan penyu	0.45				

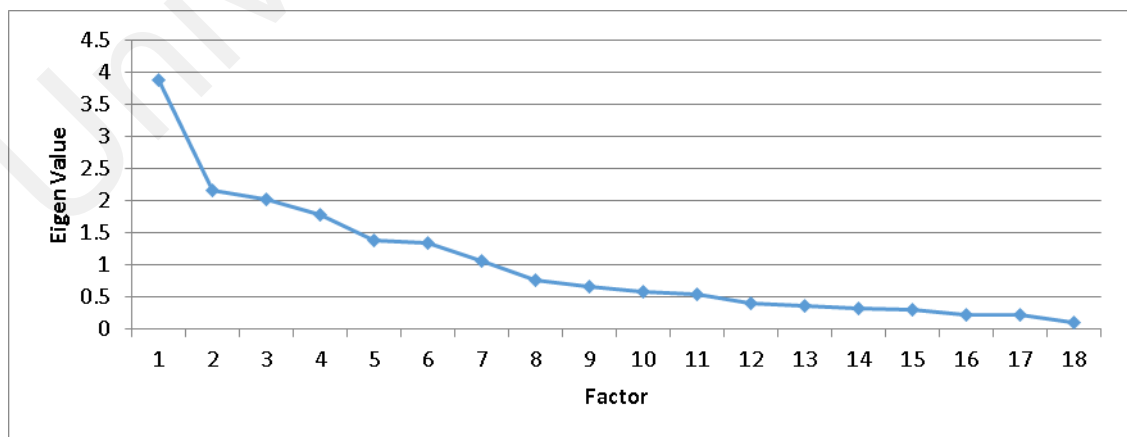


Figure 6.8: Screen Plot of the Factor Analysis on the Attitude of Fishermen with regards to Sea Turtle Conservation.

The first factor explains 20 per cent of the variance. The items with high factor loadings are “Penyu akan meningkatkan bilangan pelancong yang datang ke sini”, “Usaha melindungi penyu adalah penting” and “Pemeliharaan kawasan penangkapan ikan adalah penting”. The internal consistency among these four items is 0.78. Obviously, the latter three items represent “importance”. Thus, the factor is named “Awareness of importance”. As the item concerning tourism promotion appears here, it is assumed that the potential opportunity for additional income from tourism enticed the respondents to a significant degree.

The second factor explains 10 per cent of the variance. Two items - “Penyu semakin berkurangan kerana perbuatan nelayan-nelayan dari negara jiran” and “Penyu semakin berkurangan kerana penggunaan pukot tunda” – indicate factor loadings exceeding 0.85. Another item with moderate factor loading (0.54) is “Perbuatan mengambil telur-telur penyu secara berleluasa adalah lebih baik dihentikan”. The Cronbach’s Alpha amongst these three items is 0.67. These items all relate with causes of the decline of sea turtle population. This factor was named “Awareness of causes of decline”.

The third factor explains 9 per cent of the variance. The items with high factor loadings are “Kerajaan sepatutnya bertanggungjawab melindungi kawasan tangkapan ikan” (0.88) and “Adakah anda setuju bahawa nelayan yang menggunakan pukot pari bertanggungjawab memusnahkan penyu.” (0.63). The internal consistency of these items

is 0.61. Both items relate to government regulations on fishery and the mindset of abiding by the given rules. Therefore, this factor is given the name “law-abiding spirit”.

The fourth factor accounts for 7 per cent of the variance. The items with high factor loadings are “Nelayan-nelayan tempatan sepatutnya bertanggungjawab untuk melindungi kawasan tangkapan ikan mereka” (0.88) and “Ceramah tentang penyu adalah memberi banyak pengetahuan dan menarik” (0.67). The Cronbach’s Alpha scores 0.69. Both of the items relate to active participation of activities to safeguard the local marine environment. The factor is thus named “Readiness for participation”.

The fifth factor accounts for 6 per cent of the variance. Four items show moderate factor loading on this factor. The said items are “Nelayan menggunakan pukot pari kerana hasil tengkap adalah lumayan” (0.66), “Pemuliharaan kawasan penangkap ikan adalah penting” (0.58), “Telur-telur penyu ialah hak milik nelayan tempatan”(0.49) and “Hasil penjualan telur penyu adalah lumayan”(0.44). Three of them relate with opportunity costs of sea turtle conservation, while one item is linked to fishery resources. In a broad sense, all items are related to the opportunity to obtain incomes. Thus, the factor can be labelled “financial interests”. However, the internal consistency amongst these four items is 0.56, which is below the threshold and so this factor is not adopted.

The sixth factor covers 5 per cent of the variance. Items with high factor loadings are “Penyu mengganggu operasi penangkapan ikan nelayan-nelayan tempatan” and

“Penyu berkurang kerana perbuatan orang-orang kampung di sini”. The Cronbach’s Alpha score is 0.62. The clue to interpret the common element of the two items is miss-capture. Fishermen encounter turtles entangled with their nets. It is a burden for fishermen to release the captured turtles. The former item represents the sense of being bothered. At the same time, fishermen are mindful that their operations contribute to the decline of the species when they witness the turtles entangled in their nets. The latter item denotes this awareness of their contribution. This factor is labelled “Concern for miss-capture”.

The seventh factor accounts for 4 per cent of the variance. “Nelayan-nelayan yang menggunakan pukot pari mesti dikenakan hukuman yang berat” is an item with high factor loading. Two items show modest factor loadings - “Adakah anda setuju bahawa nelayan yang gunakan pukot pari bertanggungjawab memusnahkan penyu?” (0.47) and “Nelayan-nelayan sepatutnya melibatkan diri dalam perbincangan-perbincangan tentang program pemuliharaan penyu” (0.47). Inner consistency amongst these three items denotes a value of 0.61. The former two items both contain criticism against gill nets, whilst the third item represents the willingness of fishermen to mitigate the impacts of using illegal gear. These items are all associated with a “guilty feeling”, which is adopted as the name of the factor.

The factors identified through the Exploratory Factor Analysis were awareness on “importance of management”, “awareness on causes of decline”, “law-abiding spirits”,

“readiness for participation”, “concern for miss-capture”, and “guilty feeling”. A factor deemed to relate with financial interests was also observed but was not adopted for further analysis due to insufficient levels of inner consistency. The outcome enables an elaboration of the hypotheses obtained from the qualitative analysis. Firstly, fishermen are concerned with the impacts of their own miss-capture and turtle egg consumption, even though it has previously been corroborated that fishermen are strongly concerned with negative impacts of foreign boats and trawlers on fishing grounds and sea turtles. Second, fishermen have the ability to cope with problems pertaining to inappropriate fishing, while qualitative analysis emphasised their dependency on the government. Third, the linkage between the expectation for fishery resource management and sea turtle conservation was clarified; both law-abiding spirits and their readiness for participation relate to items concerning fishery resource management.

The following analysis uses these factors as the variables. Each variable is measured by the aggregated Likert scores of the related items. The analysis of variance will be conducted initially to examine whether the personal attributes significantly relate with the new variables. Following on, a new structural equation model will be presented to clarify on the interactions between these variables.

6.3.4 Analysis of variance

Up to here, the study has introduced two sets of variables which can be used to

enunciate the attitude of fishermen in terms of sea turtle conservation and marine resource management in general. The first set of variables emerged from the MGTA analysis and the second set has been identified through the Exploratory Factor Analysis. This study proceeds to examine how personal attributes impact personal attitudes. The analysis of variances will be conducted to assess whether each personal attribute gives statistically significant impacts to the Likert score of the variables.

6.3.4.1 Original variables

Table 6.5 on the next page shows the result of ANOVA. Interestingly, the analysis revealed that almost all attributes (Generation, place of birth, membership of MEKAR, stratification in the village, and education level) do not lead to statistically significant impacts on the attitudes of fishermen. It is nonetheless observed that it is the relationship with the oil and gas industry that significantly affects the responsible behaviour ($p < 0.001$; 1 percent level of significance) and environmental awareness ($p = 0.025$; 5 percent level of significance) of the respondents. Concerning the former variable, fishermen with family members working for the petroleum industry score significantly high. Fishermen without any relationships with the petroleum industry are next. These groups also marked higher scores in the latter variable.

Table 6.7: Analyses on Variance (ANOVA) on Attributes of Respondents and Their Impacts on Scores of Variables obtained through the Modified Grounded Theory Analysis

		F-value	p-value	Significance			F-value	p-value	Significance
Education	Responsible behaviour	0.1	0.9	n.s	Ownership of fishing boat	Responsible behaviour	0.1	0.9	n.s
	Sense of ownership	0.19	0.83	n.s		Sense of ownership	0.19	0.83	n.s
	Commitment of conservation	2.54	0.09	n.s		Commitment of conservation	2.54	0.09	n.s
	Dependency	0.35	0.7	n.s		Dependency	0.35	0.7	n.s
	Opportunity cost	1.75	0.17	n.s		Opportunity cost	0.5	0.73	n.s
	Environmental awareness	0.44	0.65	n.s		Environmental awareness	0.44	0.65	n.s
	Sense of victimization	0.81	0.45	n.s		Sense of victimization	0.81	0.45	n.s
		F-value	p-value	Significance			F-value	p-value	Significance
Place of Birth	Responsible behaviour	1.78	0.19	n.s	Membership of the community-group	Responsible behaviour	0.56	0.46	n.s
	Sense of ownership	0.39	0.53	n.s		Sense of ownership	0.49	0.48	n.s
	Commitment of conservation	0.02	0.9	n.s		Commitment of conservation	0.61	0.43	n.s
	Dependency	0.17	0.68	n.s		Dependency	1.35	0.25	n.s
	Opportunity cost	0.23	0.63	n.s		Opportunity cost	3.39	0.07	n.s
	Environmental awareness	0.24	0.62	n.s		Environmental awareness	0.19	0.66	n.s
	Sense of victimization	0.96	0.33	n.s		Sense of victimization	0.74	0.39	n.s
		F-value	p-value	Significance			F-value	p-value	Significance
Generation	Responsible behaviour	0.27	0.85	n.s	Relationship with oil and gas industry	Responsible behaviour	8.57	0.005	**
	Sense of ownership	0.66	0.58	n.s		Sense of ownership	1.44	0.24	n.s
	Commitment of conservation	1.98	0.13	n.s		Commitment of conservation	1.5	0.23	n.s
	Dependency	0.41	0.75	n.s		Dependency	1.65	0.2	n.s
	Opportunity cost	0.19	0.9	n.s		Opportunity cost	2.12	0.129	n.s
	Environmental awareness	1.07	0.36	n.s		Environmental awareness	3.93	0.03	*
	Sense of victimization	1.07	0.37	n.s		Sense of victimization	1.01	0.37	n.s

The result highlights several interesting points. First of all, there is no particular group that bears a greater opportunity cost compared to others. The study has paid great attention to opportunity costs, being aware that these costs would hamper not only project implementation but also social cohesion amongst community members. The results of ANOVA, however decreases this possibility.

Second, education does not raise awareness in this case. This finding is contrary to the assumptions of some key informants - lack of appropriate education prevents fishermen from understanding scientific information, appreciating sustainability, and from behaving responsibly. The result means that the optimism towards the positive

impacts of education is not empirically verified¹²⁹.

Third, the analysis also overturned the optimistic view of the younger generation. The result does not underpin the expected positive scenario of increased support for conservation from the youths.

Fourth, participation in the MEKAR group does not relate with any positive attitude towards conservation. A possible interpretation of the result is that most of the members might have initially joined the group merely because of goods provided by the WWF or invitations from influential parties within the village. Further, the members did not improve their awareness even after participating in several programmes offered by the group. Alternative interpretation is that fishermen are generally aware of the importance of conservation regardless of membership of the community group. In that case, a basic assumption of the Ma'derah project is turned down; in that conservation is not an idea that is alien to local fishermen anymore.

Fifth, full-time fishermen have a greater level of environmental awareness and behave more responsibly. It is still difficult to explain why a relationship with the petroleum industry has an effect on the responsible behaviour of fishermen and their environmental awareness, although this tendency is clear enough.

¹²⁹ A possible contradiction against result is that all the respondents should be categorised as less educated persons. This alternative hypothesis should be testified through statistical testing on comparison between local fishermen and more educated groups such as teachers or university students.

6.3.4.2 New variables

Table 6.7 demonstrates the results of the analyses of variance. Three attributes give statistically significant impacts on variables, whilst the rest of the attributes are irrelevant to them.

Table 6.8: Analyses on Variance (ANOVA) on Attributes of Respondents and Their Impacts on Scores of Variables obtained through Factor Analysis

		F-value	p-value	Significance			F-value	p-value	Significance
Education	Awareness of Importance	0.83	0.48	n.s	Ownership of fishing boat	Awareness of Importance	2.79	0.03	*
	Awareness of cause	0.18	0.91	n.s		Awareness of cause	3.13	0.02	*
	Law-abiding spirits	0.94	0.43	n.s		Law-abiding spirits	1.3	0.28	n.s
	Readiness for participation	0.13	0.94	n.s		Readiness for participation	1.21	0.31	n.s
	Consciousness for miscapture	1.05	0.38	n.s		Consciousness for miscapture	0.56	0.69	n.s
	Guilty-feeling	0.02	0.99	n.s		Guilty-feeling	0.47	0.75	n.s
		F-value	p-value	Significance			F-value	p-value	Significance
Place of Birth	Awareness of Importance	1.25	0.26	n.s	Membership of the community-group	Awareness of Importance	1.89	0.17	n.s
	Awareness of cause	2.53	0.11	n.s		Awareness of cause	1.21	0.27	n.s
	Law-abiding spirits	0.13	0.89	n.s		Law-abiding spirits	0.45	0.65	n.s
	Readiness for participation	0.21	0.65	n.s		Readiness for participation	0.08	0.76	n.s
	Consciousness for miscapture	0.46	0.49	n.s		Consciousness for miscapture	0.48	0.48	n.s
	Guilty-feeling	0.11	0.97	n.s		Guilty-feeling	0.21	0.64	n.s
		F-value	p-value	Significance			F-value	p-value	Significance
Generation	Awareness of Importance	39.36	0	**	Relationship with oil and gas industry	Awareness of Importance	7.8	0.001	**
	Awareness of cause	6.86	0	**		Awareness of cause	3.33	0.04	*
	Law-abiding spirits	0.88	0.45	n.s		Law-abiding spirits	2.16	0.13	n.s
	Readiness for participation	6.11	0.01	**		Readiness for participation	3.65	0.03	*
	Consciousness for miscapture	31.35	0	**		Consciousness for miscapture	2.16	0.12	n.s
	Guilty-feeling	0.88	0.45	n.s		Guilty-feeling	1.91	0.16	n.s

Generation gives statistically significant impacts on some of the variables; awareness of importance, recognition of causes of decline, readiness for participation, and concern for miss-capture. It yields effects on these variables at a 1 per cent level of significance. The score of the four variables were higher amongst the middle age group (c.45-60 years old) compared with the other three generations. The result tells us that middle age adults pay greater attention to sea turtles and are willing to collaborate with the government and conservancies. The author's interpretation is that fishermen of this

age are in their prime. Their concern about the status of the marine environment becomes more serious compared to that of the younger generation who have other opportunities for new careers. Further, they need to pay greater attention to sustainability compared to the fishermen elder than them as their subsistence relies on their fishing activities for another few decades.

Ownership of boats affects the awareness on importance and the awareness on the cause of decline. Its impacts on the variables are statistically significant at 5 per cent. Concerning the former variance, the fibre-class boat owners reached a significantly higher average score. With regard to the latter variance, the fibre-class boat owners and crew (*awak-awak*) marked high average scores compared to the other groups. It is also noteworthy that the number of owners of middle-sized boats (Class B) was significantly lower than any other group.

The study interprets the result in line with the result of the qualitative research - fishermen's recognition on the cause of decline mirrors their concern about the negative impacts of foreign boats and trawlers on fishing grounds. The impacts of these external parties are higher for owners of fibre-class boats and lower class crew as they lack the power to cope with these parties. This explains the higher score on awareness on causes of the decline. As a consequence of this sense of crisis, they expect intervention by the government and NGOs to mitigate the impacts of these external parties. This accounts for

their higher scores on awareness of importance.

Relationships with the oil and gas industry affect the awareness of importance, awareness of the cause of decline, and the readiness for participation. Its impact on awareness of importance is statistically significant at a 1 per cent level, while its impacts on awareness of the cause of decline and readiness for participation indicate a 5 per cent level of statistical significance. Awareness of importance scores significantly low amongst fishermen working part-time for the oil and gas industry. Awareness of the cause of decline and readiness for participation show the same tendencies. Fishermen without any relationship with the petroleum industry marked the highest score in terms of readiness for participation and awareness of importance.

The result is similar with that of the analysis using original variables. Full-time fishermen are clearly more aware of the endangered status of sea turtles, have a keener interest in sea turtle conservation and marine resource management. A plausible interpretation is that full-time fishermen tend to pay more attention to conditions of fishery grounds and marine creatures, as their lives crucially depend on these conditions. In addition, full-time fishermen are more likely to foster these feelings through frequent encounters with trawlers, foreign boats, and miss-captured turtles.

6.3.5 Path Analysis

Through MGTA and the EFA, the study has elucidated the kinds of factors that

can give impacts on the behaviour of fishermen. The MGTA analysis has also presented several schemes to map out the mentality of fishermen. As the final step of the analysis, this subsection testifies whether the model based on the MGTA analysis is statistically significant. Further, this subsection presents a model composed of the factors identified through the Exploratory Factor Analysis. Linkages between the factors will be clarified in this subsection.

6.3.5.1 Original variables

This section aims to elaborate on the model shown in section 6.2. The statistical method applied here is Path Analysis. It testifies whether the models are statistically acceptable, using the goodness of fit index. The number of variables used here is seven.

Table 6.9 below indicates the correlation matrix amongst the variances.

Table 6.9: Correlation Matrix among Variables regarding Fishermen's Attitudes measured with the Variables obtained through MGTA Analysis.

	Responsible Behaviour	Ownership	Interest	Dependency on government	Opportunity Cost	Environmental Awareness	Sense of being Victimized
Responsible Behaviour	1.00						
Ownership	0.30	1.00					
Interest	0.35	0.60	1.00				
Dependency	0.15	0.25	0.44	1.00			
Opportunity Cost	-0.09	0.10	0.13	0.12	1.00		
Environmental Awareness	0.02	0.15	0.23	0.36	0.03	1.00	
Victimized	0.24	0.22	0.02	0.00	0.03	0.28	1.00

Based on the matrix above, the study examines the models. The results are depicted in Figures 6.8 to 6.10.

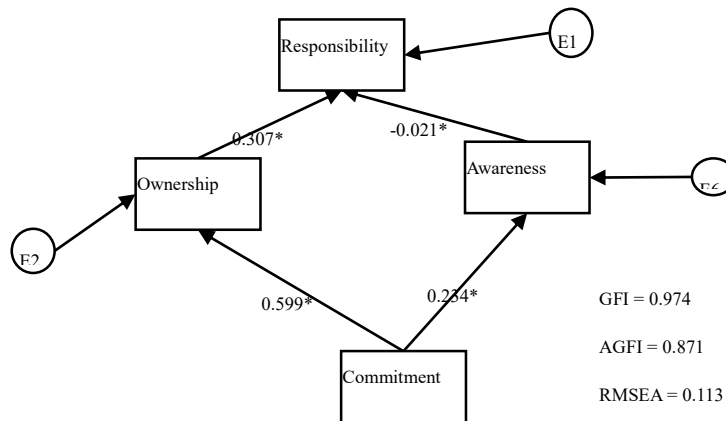


Figure 6.9: Path Analysis on the WWF Model

Figure 6.9 shows the result of the examination of the first model. The goodness of fit index of the first model is 0.992 and the adjusted goodness of fit index of the model is 0.958¹³⁰. These scores exceed 0.9, the threshold of acceptance. The path efficiency between “Commitment of conservancy” and “Ownership” displays a modest positive effect of the former element to the latter one, whilst the score between “Commitment of conservancy” and “Awareness” shows a weak positive effect of the former to the latter. The path between “Ownership” and “Responsibility” indicates a modest positive effect of the former to the latter, but the path between “Awareness” and “Responsible behaviour” reveals that there is almost no effect of the former over the latter. The programmes offered

¹³⁰ The goodness of fit of a statistical model describes how well it fits a set of observations. Measures of goodness of fit typically summarize the discrepancy between observed values and the values expected under the model in question (Olyvides and Forero (2010) *Goodness of Fit testing*, University of Barcelona, http://www.ub.edu/gdne/amaydeusp_archivos/encyclopedia_of_education10.pdf accessed on 5th May, 2014). However, it is known that the score tends to be improved when the number of samples is increased (Moriyasu (2007). *Analysis of covariance structure*, Kyoto University <http://www.educ.kyoto-u.ac.jp/cogphy/personal/Kusumi/datasem07/moriyasu.pdf> Accessed on 1st May 2014). Adjusted goodness of fit index is based upon the degrees of freedom, with more saturated models reducing fit (Hooper *et al.*, 2008).

by conservancies somehow lead fishermen in a positive direction, though the impact is not dramatic. It is also observed that the improved ownership instigates responsible behaviour of the fishermen as literature on community-based conservation have emphasised. Regretfully, it seems that environmental awareness hardly induces responsible behaviours.

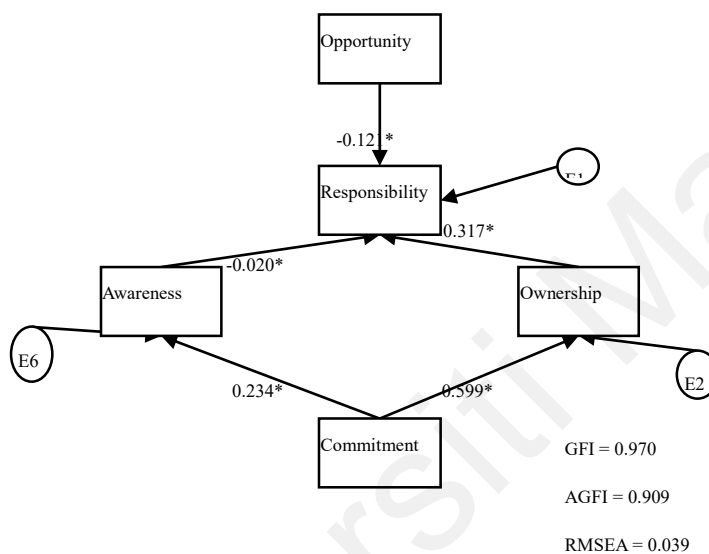


Figure 6.10: Path Analysislyses on Opportunity Cost Model

Figure 6.10 indicates the result of the analysis on model 2. Opportunity cost is the new factor added to the first model. The goodness of fit index of the analysis is 0.938 and the adjusted goodness of fit index is 0.950. The model is also acceptable as both scores exceed 0.9. As expected, “Opportunity cost” gives a negative impact on “Responsible behaviour” as the path efficiency between the two elements presented. However, the score

is interestingly small. This result is consonant with the findings of the previous chapter; the opportunity cost stemming from sea turtle conservation is not great enough for fishermen to actively resist against conservation programmes.

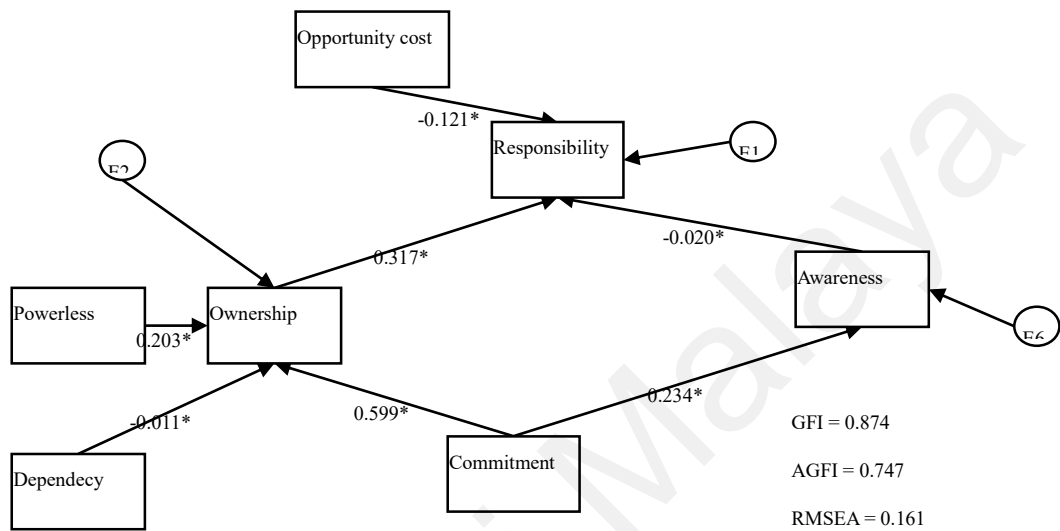


Figure 6.11: Path Analysis on Terengganu Model

Figure 6.11 represents the result of analysis on model 3. The model includes factors obtained from the findings of the qualitative study. The previous section of the chapter reported that dependency on the government, a sense of powerlessness, and a sense of being victimized are observed amongst some fishermen and these feelings could negatively affect ownership of the fishermen. The goodness of fit index of the model is 0.874 and the adjusted goodness of fit index is 0.747. These scores fail to exceed 0.9. The

hypotheses proposed in the previous chapter hence fail to improve the fitness of the model as a whole. The path efficiency between “dependency on the government” and “ownership” is -0.011. The score between “sense of weakness/being victimized” and “ownership” is 0.203. Even though the t-values still allow for their inclusion in the model, these factors prove to give little impact on ownership. It is also safe to say from the model above that impacts of these factors can be offset because “commitment” has an obviously greater impact on “ownership”. The results of Path Analysis induce the author to reconsider the hypothesis. The author thus conducts an Exploratory Factor Analysis to elaborate on the hypotheses.

6.3.5.2 New variables

The next step of the analysis is to present structural relationships amongst the identified variables. A Path Analysis is conducted here again. The conditions are kept equivalent with the analysis on the original variables.

Table 6.10: Correlation Matrix amongst Variables regarding the Attitudes of Fishermen measured by the Variables obtained through Factor Analysis.

	Importance	Cause	Law-abiding	Participation	by-capture	Guilty-feeling
Awareness of Importance	1.0000					
Awareness of cause	0.4191	1.0000				
Law-abidding spirits	0.2406	0.2982	1.0000			
Readiness for participation	0.0994	0.1123	0.1260	1.0000		
Conciousness for miscapture	0.1068	0.4434	0.3153	0.4222	1.0000	
Guilty-feeling	0.0254	0.4135	0.0543	0.2251	0.4882	1.0000

Hypotheses concerning the relationship between the variables are as follows:

1. Awareness of causes of decline will trigger law-abiding spirits.
2. Law-abiding spirits will instigate guilty feelings. The guilty feelings are also strengthened by consciousness for by-capture.
3. Law-abiding spirits will increase the awareness of importance and readiness for participation.
4. Awareness of importance results in a readiness for participation.

These hypotheses can be expressed as equations (1) to (4) below:

$$L = \lambda_{i} L + \gamma_{i} \quad \cdot \cdot \cdot (1)$$

Where

L: Law-abiding spirits Ac: Awareness of cause of decline

γ : Residual error

$$G = \lambda_{ii} L + \lambda_{iii} C + \gamma_{ii} \quad \cdot \cdot \cdot (2)$$

Where

G: Guilty feeling L: Law-abiding spirits

C: Consciousness for by-capture γ : Residual errors

$$AI = \lambda_{iv} L + \gamma_{iii} \quad \cdot \cdot \cdot (3)$$

Where

AI: Awareness of importance L: Law-abiding spirits

γ : Residual errors

$$RP = \lambda_{v} AI + \lambda_{vi} L + \gamma_{iv} \quad \cdot \cdot \cdot (4)$$

Where

AI: Awareness of importance L: Law-abiding spirits

γ : Residual errors

These linear equations can be merged into the model indicated in Figure 6.12 below:

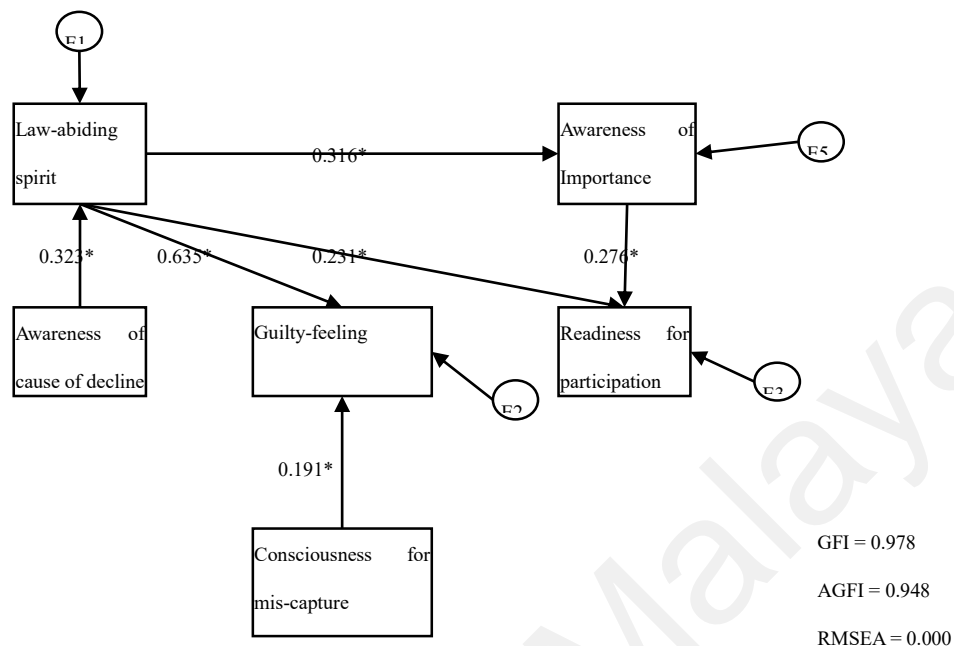


Figure 6.12: Path Analysis on Modified Terengganu Model

The figure illustrates how normative motivation encourages environmental responsible behaviour in detail. The cue of the flow is awareness for causes of the decline. As fishermen recognise that foreign boats, trawlers, and even their own consumption of turtle eggs triggers the degradation of marine environment, they expect the government to tackle these problems through regulations - cooperating with the government by abiding by the given rules. This reaction corresponds to the flow from awareness of causes of decline to law-abiding spirits, which plays a pivotal role to explain the rest of the figure.

Law-binding spirits is the starting point of two flows on the figure. A flow shows that the law-binding spirits give statistically significant impacts on the awareness of importance and readiness for participation. This indicates that the attitude to respect the given rules bolsters the support of fishermen for conservation efforts by the government or NGOs. It also leads fishermen to participate in the relevant activities in their villages. Another flow depicts that law-binding spirits evokes a guilty feeling against using gill nets, whilst the concern for miss-capture further strengthens that feeling.

6.4 Discussion

Up to here, the chapter has analysed the perception of fishermen towards sea turtle conservation. The qualitative analysis illustrated the ideas of fishermen concerning threats to sea turtles, opportunity costs of conservation, community-based programmes, and turtle egg consumption. The quantitative analyses further identified psychological factors affecting the attitudes of fishermen, the effects of personal attributes that moulded their attitude towards conservation, and presented models to map out the perception of fishermen concerning conservation and fishery resource management. The following section studies the results of the analysis. It firstly discusses the findings of the qualitative analysis, before making deductions from the results of the quantitative analysis. The main topics looked into are the acceptance of fishermen in terms of sea turtle conservation; the issues that remain unsettled amongst the managing parties and their effects on the

perception of fishermen with regards to conservation; the effects of personal attributes; and factors motivating fishermen to support and participate in conservation programmes.

6.4.1 Acceptance of sea turtle conservation

The acceptance of fishermen in terms of conservation is discussed in this subsection.

The general statement can be divided into three aspects:

- a. Acceptance of affinity towards a particular species
- b. Acceptance of resource management
- c. Acceptance of community-based management

Fostering an affinity towards a particular species is a common avenue for conservation. Campaigns held by WWF aim to foster such feelings. Yet, in the context of the villages studied, this strategy is not productive because most fishermen already feel such an affinity with sea turtles. The result of the Path Analysis pinpointed the scepticism against the efficiency of awareness raising programmes in the villages studied. Though the Path Analysis shows that the commitment of conservancies would lead to a positive impact on environmental awareness and ownership, the linkage between awareness and responsible behaviours is much weaker than the linkage between ownership and responsible behaviour. Additional efforts to increase affinity will not be rewarded as its

marginal utilities dwindle.

Fishermen also accept managing sea turtles, with a focus on materialistic gains. Turtle egg collection would however, still pose a paradox; as it is the major motivation for fishermen to support conservation programmes, yet its negative impact on the sea turtle population is already commonly known of. On the other hand, fishermen demand for improved fishing resource management due to the rapid degradation of fishery grounds. Even though the existing sea turtle conservation programmes only aim to save turtles, the programmes should seek to strengthen their ties with parties in charge of fishery resource management to channel conservation efforts to match the concerns of the local community.

Local fishermen are still unfamiliar with the concept of community-based conservation. The MGTA analysis highlights the fact that great governmental presence over the past four decades has imprinted in the minds of fishermen that sea turtle management is the responsibility of the government. A number of fishermen are even frustrated with the new approach, although conservation efforts on their own are not actually painstaking. The recognition of fishermen with regards to the decline in turtle population explains this tendency. As the MGTA analysis and Factor Analysis have clarified, fishermen attribute the decline of turtles to trawlers and foreign boats. To tackle these problems requires the strong commitment of the government. Fishermen clearly

recognise the limitation of the community-based approach, hence this being the reason a number of them are very sceptical with its efficiency.

In line with this, the inappropriate implementation of community-based programmes must be pointed out. The managing parties try to use the Fishermen Association as a platform to group the fishermen together and convey information to them. Judging from the very high level of awareness on illegality, the association has effectively conveyed information from the Department of Fisheries to local fishermen. Nevertheless, it still remains dubious as to whether or not interactive communications between the managing parties and the fishermen have really achieved the 'dialogue with fishermen'. The sessions have no function for decision-making or consensus-building. Any discomfort felt amongst the fishermen in terms of conservation is not communicated back to the managers and therefore neither the project design nor contents of village level programmes have been updated. As a result, several fishermen have shunned the meetings, with some even exiting the MEKAR group whilst keeping their silence and not openly resisting the project. Community-based conservation is also a method that is unfamiliar to fishery officers, and as such, previous experiences using the typical top-down style has overshadowed its implementation.

6.4.2 Unsettled management issues and their effects on fishermen's mentality

The previous chapters described that major stakeholders have not achieved a

consensus on several issues pertaining to sea turtle conservation. Analyses in this chapter indicates that such issues have an effect on the attitude of fishermen.

All the respondents from fishery villages pointed out the significant effect that trawlers have in causing damage to both sea turtles and fishing grounds. However, as presented in chapter 2, the compulsory instalment of turtle exclusive devices to trawling boats is still being debated. The situation evokes a sceptical attitude of fishermen towards community-based conservation. In their understanding, awareness-raising in their own villages is not effective as long as the main culprit causing the sea turtle population to decline remains unregulated. A point to note is that the cost for sea turtle conservation is actually distributed unevenly within the fisheries sector, despite provided the use of gill nets of traditional coastal fishermen being very strictly regulated.

Another unsettled issue affecting fishermen is the turtle egg collection license system. Even though the WWF tries to persuade fishermen to relinquish egg consumption through awareness-raising campaigns, both qualitative and quantitative analyses depict that collecting turtle eggs evokes guilty feelings much less than the use of gill nets. The most plausible explanation for this is the differing legal status of the two activities. Several fishermen even consider it their right to collect turtle eggs. As key informants explained, the licensing system can enhance the efficiency for management of the nesting beaches. At the same time, however, it condones the collection of fishermen and the

consumption of sea turtle eggs. Under the existing license system, awareness-raising would not function sufficiently.

6.4.3 Personal attributes and attitude

Attributions of the respondents, such as education level, place of birth and membership in the MEKAR group do not significantly affect original variables. Relationships with the oil and gas industry significantly affect several variables. Generation and boat ownership only gave impacts on several variables obtained from the Factor Analysis, and they did not affect any of the variables drawn from MGTA analysis.

The relationship with the oil and gas industry gives significant effects on responsible behaviour, environmental awareness, awareness on importance, awareness on cause of the decline, and readiness for participation. All of these variables indicate a significantly higher score of full-time fishermen than their part-time counterparts.

Generation and boat ownership give statistically significant impacts on several of the new variables. Generation gives statistically significant impacts on some of the variables; the awareness of importance, the recognition of causes of decline, the readiness for participation, and concerns of miss-capture. The score of the four variables were higher amongst the middle age group (c.45-60 years old) than the other three generations. The result tells us that middle age adults pay greater attention to sea turtles and are willing to collaborate with the government and conservancies. The ownership of boats affects the

awareness on importance and awareness on the cause of decline. Concerning the former variance, the fibre-class boat owners marked a significantly higher average score. With regards to the latter variance, the fibre-class boat owners and crews (awak-awak) marked high averages scores compared to other groups. It is also noteworthy that the number of owners of the middle-sized boats (Class b) was significantly lower than any other groups.

These results show us four important points for argues. First, the optimism about the positive effects of education should be revised. As introduced in the previous chapter, key informants such as Ms Rahayu and Ms Lau from WWF Malaysia are concerned that fishermen fail to understand the scientific knowledge and consequentially remain oblivious to the significance of conservation activities. These assumptions are reasons to conduct community-based awareness raising programmes. However, the educational level was found to be irrelevant to environmental awareness as far as the fishermen in the studied villages are concerned¹³¹. Second, the effects of organising a community group should not be overestimated. The members of the association are no different from non-members in terms of environmental awareness. Remarks of the key informants presented in the previous chapter provide clues to interpret this overwhelming result: the MEKAR group recruited its members by making use of existing organizations such as a Teachers' association and Fisher association. As Mr Amran and Mr Ramlee both mentioned, several

¹³¹ Another possible interpretation is that the educational level fails to show its effect because educational level of almost all of the fishermen remains very low. None of the respondent complete tertiary education.

powerful members of the two existing associations tried to entice their members to join the MEKAR group. Efforts of these powerful persons resulted in an increase in the number of members of the group. However, it is questionable as to what degree the members were genuinely interested in sea turtles and conservation in general. Third, economic determinism should be considered. Several articles of literature (e.g. Amarasooriya 2000, Kapurusingha 2000, and Kumoyama 2004) advocated that the low income of households and economic backwardness of a project site can be the greatest threat for any conservation project. In line with their arguments, fishermen with relatively lower incomes would be less conscious about the endangered status of sea turtles and degradation of marine environment than those in the higher income group. Lower incomes would also result in a more hostile attitude to conservation programmes and resource management. This result was the opposite to the assumption. Fourthly, the environmental consciousness of active fishermen should not be underestimated. Active, full-time fishermen are the ones who pay great attention to sea turtles, and show most concern for the sustainability of marine environment, and tend to be cooperative with conservation programmes. Their diligent conscientiousness is not a surprise as their livelihoods depend on the marine ecosystem. Their frequent encounters with entangled turtles can also invoke sympathy for the reptiles. These elements seem to be overlooked as a result of widespread prejudice against 'traditional' fishermen.

6.4.4 Motivations for supporting conservation

Through Path Analysis with original variables, the author concluded that the commitment of conservancies would give positive impacts on environmental awareness and ownership, although the linkage between awareness and responsible behaviours is much weaker than the linkage between ownership and responsible behaviour. The analysis further shows that opportunity costs do not strongly encumber these positive attitudes to sea turtle conservation. The prohibition of gill nets has had decades of history and the shock has been absorbed well since then. The Path Analysis method supported the observation. Though the analysis well-supported the hypotheses of the author concerning awareness-raising and opportunity cost, it highlights the necessity to revise the hypothesis with regards to mental impediments on conservation such as dependency on the government, the sense of powerless, and the sense of being victimised. The third model, which incorporates these factors, scored a much lower adjusted goodness of fit index compared to other models. In addition to this, the path efficiencies of these factors were small, even though their effects on ownership were statistically significant.

The fourth model incorporated the variables obtained from Factor Analysis, and indicates how the general norm and daily experiences encourage the environmentally responsible attitude of fishermen. Awareness for causes of decline, which is linked with foreign boats and trawlers, evokes law-abiding spirits. It sequentially triggers the awareness of importance and readiness for participation. The attitude of respecting the set

rules is important bedrock for fishermen to support further efforts for conservation. Spurring feelings of guilt with the use of gill nets is also instigated by law-abiding spirits, whilst it is also strengthened by concern for miss-capture.

The fourth model gives two important lessons for us. First, it clarifies to what degree fishermen can collaborate with the government or conservation NGOs. It demonstrates that fishermen do not only wait for remedies given by the government but will also cooperate with the government by abiding by the set rules; for instance, refraining from the use of gill nets. On the other hand, the model also suggests that fishermen are still less willing to participate in conservation programmes actively, judging from the small path efficiency. This is consistent with a finding in the qualitative analysis. For most fishermen, “tanggungjawab” means to abide by the law. Second, the fourth model provides an explanation to the environmentally responsible attitudes of fishermen without requiring the involvement of conservancies. What motivates fishermen is common sense to respect the law, a sense of crisis in facing the degrading marine environment, and sympathy towards entangled sea turtles. Even though all of these elements seem ordinary, the key informants have clearly underestimated their positive effects. Fishermen are not completely ignorant or totally unfamiliar with the idea of conservation. Thus, it is deduced that enlightenment by the local elites is not the only avenue that fishermen become conscious about the survival of the endangered species.

Chapter 7: CONCLUSION

This chapter summarises the findings of previous chapters, explicates academic significance of the study, and suggests possibilities for future studies. Firstly, it briefly reviews original findings of the study. Sequentially, it examines the significance of these findings in view of literatures presented in Chapter 3. The argument is followed by suggestions for further studies.

7.1 Major Findings

As presented on Chapter 1, the core tasks to be solved through the entire study are as follows:

1. To describe the interests of the stakeholders behind existing conservation programme and how the stakeholders achieved the consensus.
2. To describe the local economy in which the conservation project is being carried out.
3. To identify the physiological factors, which would affect fishermen's

behaviour towards sea turtle conservation.

4. To present the voice of the local fishermen, which is underrepresented in the sea turtle conservation projects.

Let us summarise major findings of the study in line with the objectives presented above.

Previous case studies on sea turtle conservation in developing nations more or less highlighted the rampant poverty situations. Ma'derah project is also designed to tackle problems commonly found in poor rural areas in a developing country. However, the economic status of Southern Terengganu differs very much from this. Since the advent of petroleum in the early 1980's, Southern Terengganu has become one of the most industrialized areas in Peninsular Malaysia.

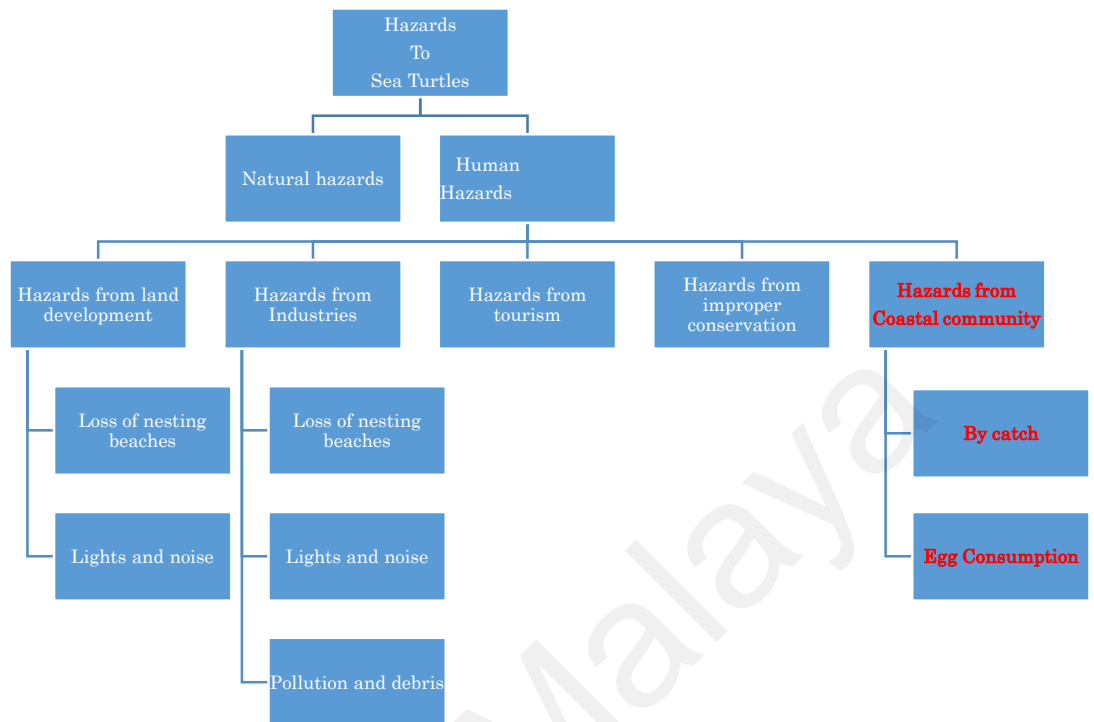


Figure 7.1: Threat of Sea Turtles

From the vantage point of sea turtle conservation, drastic loss of nesting beaches because of land development has severely threatened survival of sea turtles. In the course of development of petrochemical industry, industrial hazards have also increased as a result. These problems can hardly be solved through community-based environmental education in fishery villages. Furthermore, instead of seeking a more holistic management of the coastal zone, sea turtle conservation in Terengganu narrowed down its target on hazards from coastal communities presented on the right end of the

figure above.

The existing strategy was adopted from the workshop on sea turtle conservation and management in Malaysia held from 14th to 17th December in 1987 under the sponsorship of ESSO Malaysia. It was a roundtable meeting of major stakeholders including conservation NGOs, biologists, fishery officers, representatives of petrochemical industry, and state government officers. Fishery officers did not oppose the restriction on traditional coastal fishers because they already had a policy in place to diminish traditional coastal fishery in view of modernisation of the sector. On the contrary, restricting operations of the petrochemical industry is too difficult for any party in Terengganu, even though criticism against the industry exist according to certain documents reviewed before. The revenue of the state depended heavily on the petroleum and petrochemical industry. Since the meeting, no marine biologist has boldly claimed to remove any facility of the petrochemical complex, as the industry has been the sole sponsor of conservation activities.

The case poses important theoretical questions. The contributions of the petrochemical industry have solved financial problems from which almost all the conservation projects in the Third World have suffered. Petrochemical industry compensates its external diseconomy very responsibly. In addition, fishery officers have judged that opportunity cost to fishing industry is small enough to accept. Therefore, the

arrangement is very successful within the conceptual framework of orthodox environmental economics. The Ma'daerah sea turtle sanctuary steering committee was also established smoothly due to a long history of cooperation amongst the WWF, Department of Fisheries, and the petroleum industry in sea turtle conservation in Terengganu. Theoretically, transaction cost of forming the committee is very small. However, the consensus amongst the stakeholders resulted in the insufficient allocation to the protected area; barely 1.6km from more than 50km coastline of Paka-Kereh rookery is designated as protected area. A fundamental question is whether this designation is meaningful in terms of ecology. Furthermore, it is also questionable whether Ma'daerah is a proper site for conservation projects in ecological sense. The records on biddings in the late 1970s also tell us that Ma'daerah was not a salient nesting ground: the price of egg collection at Ma'daerah had been mediocre compared to other beaches in the Paka-Kerteh rookery and was far cheaper than that of Rantau Abang. Considering other productive beaches have all disappeared, it is dubious that the designation of the tiny sanctuary could effectively maintain the population. As Pareto's optimality does not serve as a guideline to realise social justice, the conventional principals of environmental economics does not necessarily lead us to an ecologically desirable solution.

Strong presence of government has been a feature of sea turtle conservation programmes in Terengganu. Decision-making and planning role usually rest on the

government. Rangers from the department of fishery reside in Rantau Abang, Pulau Redang, and Ma'daerah. The rangers have significant visibilities as they have routinely confiscated illegal nets, run hatcheries, and attended sessions held in villages. The government has expected the local community to mobilize ready-made projects, using the local term "*Gotong-Royong*". The expected role of NGO is to compliment the government mainly through awareness-raising. Considering these situations, the Ma'daerah project is merely a co-management. It neither pursues nor entails social change and a grass-roots democracy.

At the village level, WWF tries to avail the existing fishermen's association as a platform to implement community-based environmental activities. This is an effective tactic to convey top-down instructions, or disseminate information concerning sea turtle conservation. It is nonetheless sceptical whether interactive communication between the managing parties and fishermen, which is allegedly an important feature of Ma'daerah project, was possible through the channel. Key informant interview tells us that literal dialogues have never occurred on "dialogue with fishermen" sessions. In addition, the sessions have no function in decision-making or consensus building. Any objections by the fishermen to conservation is not directly fed back to the managers and therefore neither project design nor contents of village level programs have been updated. Fishermen mostly kept silence during the meeting. Some of them eventually shunned

meetings whilst several left the MEKAR group. Further, the cross-tabulation analysis in Chapter 6 told us that the members of the association do not differ from the non-members in terms of environmental awareness. Remarks of the key informants give us clues to interpreting this overwhelming result: MEKAR group recruited its members to make best use of the existing organizations. Some powerful members of the two existing associations tried to entice their members to join MEKAR group. Efforts of these powerful persons resulted in rapid increase of the members of the group. However, it is questionable to what degree these members were diligently interested in sea turtles conservation.

Key informant interviews also revealed that programme managers consider that the backwardness of the region has resulted in the ignorant attitude of the local community. This vision pertaining to local fishermen is consistent with the existing conservation strategy, which primary aims was to enlighten the local community. On the other hand, their expectation toward the effect of community-based awareness-raising was optimistic. Nonetheless, the study poses some questions to their viewpoints. Analysis of variance revealed that attributions of the respondents, such as the education level and membership of the MEKAR group, do not significantly affect the attitude of fishermen toward conservation. The result differs from an assumption of the key informants; fishermen fail to understand scientific knowledge due to lack of education and remain oblivious to the

significance of the conservation activities. On the other hand, the study demonstrated that fishermen, crews without boats, full-time fishermen, and fishermen in their middle age are more conscious of the sustainability of the marine environment, and hence tend to be cooperative in terms of conservation efforts. Even though these groups are expected to be ignorant about the importance of conservation, their diligent consciousness is not a surprise as their subsistence relies on the marine ecosystem service. Their frequent encounters with entangled turtles can also evoke sympathy to the reptiles. The study points out that deeply rooted prejudice against coastal fishermen and indifference with fishermen's sense of crisis over increasingly degrading marine environment has resulted in the discrepancy.

Do fishermen accept conservation? The question was analysed from three aspects; attitude toward the precious species, attitude toward resource management and attitude toward community-based programmes. The study concluded that fishermen are generally cooperative with marine resource management and co-management programmes do not evoke antipathy. However, autonomous community-based conservation is unlikely to function at present.

Most fishermen already have a certain degree of affinity to sea turtles. Even though fostering affinity is a common tactic of conservationists, the author is sceptical about the efficacy of such campaign under the condition of the studied villages. Though WWF is

holding advertising campaign to foster affinity, its marginal utilities will increasingly dwindle according to the principle of microeconomics.

Fishermen are also motivated to accept resource management. They even demanded more strict resource management, given the rapid degradation of marine environment. As they consider both fishing grounds and sea turtles to be seriously threatened by trawlers and foreign boats, strict control of these outsiders is highly expected. The fishermen do not only wait for remedy given by the government but also cooperate with the government by abiding to set rules. With regard to sea turtle conservation, their law-abiding spirits means that they would refrain from using gill nets at all cost.

There are two points to bear in mind here. First, compulsory instalment of turtle exclusive devices to trawling boats is still under discussion at this moment. Consequently, some fishermen are sceptical toward the efficacy of the community-based programs. In their understanding, awareness-raising in their own villages is not effective as long as the main culprit of the sea-turtle-decline remain unregulated. The uneven treatment within the fishery sector should be revisited and provided with strict restriction on the use of gill nets by coastal fishermen. Second, some fishermen support sea turtle conservation because of expectation toward greater harvest of the eggs. Even though both the WWF and the Department of Fisheries have requested that fishermen relinquish egg

consumption voluntarily, fishermen consider the collection and consumption of turtle eggs as their right authorized by the government under the egg collection license system. The psychological effect of license system to condone fishermen's consumption of eggs should not be overlooked, even if the system could enhance efficiency for management of nesting beaches.

As the government has played leading role for four decades, thus its presence is still dominant. At the present moment, conservation without commitment of the government is beyond the fishermen's imagination. Further, fishermen know well enough that community-based efforts can hardly mitigate threat of trawlers and foreign boats. Solution for these problems primarily rests on the government. In addition, fishermen are still unfamiliar with the concept of community-based conservation. Some fishermen are perplexed with the offered programmes as they are requested to attend repeated meetings, which does not seem practical for them.

The study further identified factors affecting fishermen's behaviour, measuring their impacts, and presenting structural model to explain how these factors interrelate each other.

Based on the interviews with fishermen, the study obtained a set of hypotheses concerning factors behind behaviour of the fishermen toward sea turtle conservation. Reasons to enhance fishermen's support to conservation are as follows:

1. Local fishermen feel an affinity towards sea turtles to a certain degree.

2. Local fishermen concern about the degrading fishing grounds.

Consequentially, they support resource management in general.

3. Most of fishermen consider the opportunity costs of sea turtle conservation to be small enough.

On the other hand, the following factors are deemed to hamper ownership, which is considered to be necessary for a successful co-management:

4. Local fishermen regard themselves as a victim of mindless actions of powerful parties from outside of their villages. Therefore, they are unlikely to consider themselves as a culprit of sea turtle decline.

5. Local fishermen consider that they are not powerful enough to clamp down on outsiders. As a result, they are suspicious about advantage of co-management.

6. Fishermen consider that conservation is a work of experts from outside. The government especially, is regarded as the only party which is suitable for conservation.

These hypotheses were converted into path models composed of seven variables – responsible behaviour, interest in conservation programmes, environmental awareness, sense of ownership on home villages, sense of being victimised by powerful third parties, and sense of powerlessness. In addition, six factors affecting fishermen's behaviour is identified through exploratory Factor Analysis in view of elaboration of the hypotheses. These are awareness of importance, awareness of causes of decline, law-abiding spirit, readiness for participation, concern for miss-capture, and guilty feeling. These factors were also used as variable for Path Analysis to present causal relationship among the factors.

Path Analysis revealed that the commitment of conservancy give positive impacts on environmental awareness and ownership. At the same time, however, the linkage between awareness and responsible behaviours is much weaker than the linkage between ownership and responsible behaviour. The hypothesis on mental impediments such as dependency on the government, sense of powerless and sense of being victimised were

not supported by the quantitative analysis.

Further, the analysis showed that opportunity cost does not give strong negative impact on responsible behaviours. Considering that Factor Analysis also failed to identify a factor relating with opportunity cost, the study concludes that opportunity cost does not give significant impacts on fishermen's behaviour. This result is also consistent with findings of MGTA analysis.

On the other hand, the quantitative analysis illustrated that quotidian norm fostered through day-to-day experiences significantly encourages the environmentally responsible attitude of fishermen. The sense of crisis felt against the threat of trawlers and foreign boats is an impetus to remind them about the importance of regulations to safeguard marine environment. The attitude of respecting a given set of rules serves as an important bedrock for conservation. Law-abiding spirits, strengthened by concern for miss-capture, also instigates the guilt of using gill nets.

Further, two important lessons can be learnt through the model. First, path-efficiencies amongst variables indicated that fishermen are not sufficiently motivated to participate in confiscation of illegal gears and programmes held in villages, even though they are very much willing to cooperate with the government by keeping given rules. For most fishermen, "tanggungjawab" means to abide by laws. Second, the model proved that fishermen have spontaneous motivations to support conservation as it does not

incorporate influence of offered programmes as a variable.

7.2 Significance

This study presented socio-psychological factors behind the behaviour of fishermen through systematic data collection, coding and quantitative test of the hypotheses. Even though conservancies have been interested in psychological factors behind behaviour of the target groups, most of the previous studies at most pointed out that “attitudes” of local community had been an obstacle to the projects. Most of the previous studies also mentioned psychological barriers on the ground of casual observation. It is safe to say that this study excels previous studies in terms of understanding the behaviour of the target group. In addition, the study also presented the process of consensus-building amongst the stakeholders. This is another salient feature of the study because most previous studies on sea turtle conservation in the Asia Pacific region only documented the present status of existing projects without paying sufficient attention to local contexts. The sociological inquiry presented by the study filled the crucial vacancy. The study’s contribution is particularly significant in a Malaysian context since no social scientists have conducted in-depth analyses on marine conservation.

Further, the study bears significance as a case study of community-based conservation in a newly industrialised country. Main topics in previous studies on community-based conservation in Asian countries were poverty among local community,

poaching out of necessity, and colliding interests between active primary industries and conservation programmes. However, the lessons drawn from these studies are gradually losing relevance under the context of Asian countries in the 21st Century, given the drastic industrialisation and economic development in the region. Adhering to the same old image of Asian rural society would hinder the project managers from catching up on the reality. For instance, the outcome of conservation project in Southern Terengganu actually rests on effective control on land development and commercialised trawlers, while the on-going project focuses on small scale coastal fishermen and their underpopulated villages. The study poses a crucial question on the effect of this kind of community-based conservation projects, taking rapid shift of Asian economy into account.

The study also made two important theoretical contributions to conservation study. First, it deepens discussion on mitigation of external diseconomy through scrutiny of the existing arrangement among key stakeholders. Second, it identifies how non-economic factors affect behaviours of inhabitants and empirically overcome economic determinism regarding attitudes of people.

In macro level, as introduced, petrochemical industry has financed marine conservation projects in Terengganu state. From the vantage point of conventional environmental economics, this is an ideal arrangement. The study nonetheless presents a new perspective with respect to the arrangement: an ideal solution in terms of economics

can remain inappropriate from ecologic viewpoint. The money spent to sea turtle conservation is mainly allocated to enlighten small-scale fishermen; whilst coastal development related with petrochemical industry has been condoned in payment for the financial contribution of the industry. Though the sanctuary is designated for mitigating negative impacts of land development, it is too small to recover the population of the reptile. Campbell (Campbell 2007) emphasised that one should not overlook the political aspect of community-based conservation because the power of the managing parties and local community is asymmetric and the former can choose contents of programmes and boundary of protected areas in an arbitrary manner. Exploring the economic context of the existing conservation strategy, the study forwarded her argument and contributed to channel theoretical debates on community-based conservation to political ecology.

At a micro level, the study empirically overcame economic determinism pertaining to debates on conservation in the Asian developing nations. The factors identified through quantitative analyses were such as a sense of crisis over the degrading marine environment, quotidian moral to respect laws, and sympathy for a familiar wildlife. Furthermore, it was the relatively lower-income group who are more motivated by these factors.

Literature findings (e.g. Amarasooriya, 2000, Kapurusingha, 2000, Kumoyama, 2004) advocated that low-income households and economic backwardness of project site

could be the greatest threat for any conservation project. In line with their arguments, fishermen with relatively lower income should remain less conscious about the endangered status of sea turtles and degradation of marine environment than higher income group. Lower income should also result in more hostile attitude to conservation programmes and resource management. The findings of the study was nonetheless opposite to these assumptions. In this sense, the study can also serve as a milestone to surmount a prejudice against people in Asian developing nations. The local community does not merely pursue short-term economic interest without paying attention to survival of precious species or sustainability of ecosystem.

In addition, the study bears significance as a contemporary history of the East Coast Peninsular Malaysia. Even though it has been more than three decades since the advent of petroleum off Terengganu, its old image of poverty and backwardness persists. On the other hand, social change that occurred in the course of its industrialisation has been hardly documented. The study is a pioneer work to describe how the newly emerged gigantic industry build consensus with other stakeholders.

7.3 Recommendations for further studies

The framework of the study can be applied to investigate other conservation projects. Despite having excellent biodiversity, the accumulation of sociological study on conservation project is still limited in Malaysia and other South East Asian countries. For

instance, saving *Orang-utans* and Malayan Tapirs are very urgent tasks in Malaysia. Whereas rapid development of oil plantation allegedly contributes to their drastic decline, conservation of these precious animals should present great similarity to this study. Mitigation of negative impacts of an industry that plays a vital role in the national economy is the ultimate task of the projects. The study can serve as a baseline for analysing these projects.

Another task can be to compare the findings of the study with sea turtle conservation project at other places in the country. For instance, a key informant mentioned that the implementation of a community-based activity is less effective in Malacca due to lack of potent existing organisations. Reflection of different social conditions on people's attitude requires an in-depth investigation. Major rookeries in Borneo such as Pulau Selingan in Sabah, Pulau Talang-Talang in Sarawak, and Serasa Conservation Centre in Brunei should be also included in the scope of studies in future.

Concerning Terengganu's sea turtle conservation, the author proposes seven ways to expand the study. First, appropriate representatives of the petrochemical industry should be interviewed and their views over conservation projects are presented more directly. Even though the petrochemical industry is one of the central players of the study, the study fails to present actual opinion of the relevant persons due to availability. Second, perceptions of owners and crews of the trawling boats should be scrutinised. Whilst

coastal fishermen severely criticised trawlers as the greatest threat to sea turtles and fishing ground, viewpoints of the latter are not reflected on the study. Colliding interests within the fishery sector is to be explored in the following studies.

Third, the trade of sea turtle eggs in local market such as Pasar Payang in Kuala Terengganu should be conducted. As eggs from Borneo and Indonesia are allegedly sold at the Market, the study may reveal the trade route beyond the state border. Fourth, women in the fishery villages should be interviewed. The findings of the study could not help but be gender-biased one because collecting information from female members of the villages is difficult for a male researcher in traditional fishing villages. A female researcher can enrich the findings of the study, even conducting similar semi-structured interviews at the same villages. Fourth, the mentality of the members of the teachers' association should be investigated. Key informants suggest that teachers are the dominant component of MEKAR group after many fishermen withdraw from the group. The reasons as to how and why the mind-set of the two groups differ are worth investigating. Fifth, the comparison between fishermen in the studied village and those in other villages is recommended to examine the effects of community-based programmes. The same questionnaire and statistical methods are applicable for this purpose. Sixth, the contents and efficiency of educational programmes for children should be examined. Whilst educational programmes for adults mainly targets the fishermen, WWF also put great

emphasis on programmes for local children. An investigation on programmes on kids would complement this study.

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