Exploring Social-Ecological Regime Shift and Governance: Coastal-Marine Systems in the Gulf of Thailand, Malaysia

by

Dulguun Maidar

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This research examines social-ecological regime shift in a coastal-marine systems setting. The research investigates the social-ecological factors influencing regime shift, takes into account their resulting impacts, and pays attention to the rapid environmental and social changes. The principle aim of these research findings is to enrich the knowledge base of regime shift, add valuable insights to understand how societal attributes are imbued in the regime shift, and better study the impacts of the social-ecological regime shift on social structures in marine social ecological system. The research evaluates the influence and implications that the social-ecological regime shift has on various social groups' ability and potential to derive benefits from local resources. The social groups and societal drivers causing social-ecological regime shift are examined and identified to explain interwoven links between societal factors' connection with environmental change. Societal drivers can be associated with the power held by the various groups and individuals who are actively engaged in initiatives taken in the social and economic spheres. In particular instances, regime shift's impacts can be felt unevenly by the social groups showing equity and power imbalance. In response to the uncertainty and unpredictability followed by social-ecological regime shift, an intensive and detailed analysis on the governance and management policy options is studied in this thesis. The outcome of this research examines social-ecological regime shift in the context of marine social-ecological systems and provides a potential governance option to manage efficiently.

Keywords: social-ecological regime shift, rapid social ecological change, resource, adaptive co-management, governance, power cube, equity

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CHAPTER 1

Introduction

1.1 Background

Regime shifts are characterized by an established equilibrium state shifting to a new equilibrium state by crossing over the threshold point. By recognizing the escalation of ecosystem altering regime shift prior to passing the threshold level, people have a chance to prevent an unpredictable (and often less desirable) new equilibrium state (Hughes 2013). One of the dangers of a new equilibrium state is related to the unpredictability which comes with it. Predicting potential social-ecological issues related to a new equilibrium state can be a difficult task. The transition to a new equilibrium state endangers previously established ecosystem interrelationships within and between ecosystem and social systems. The amount of potential loss of capital, social structure, and environmental damage are hard to predict, since the newly forming equilibrium state would most likely alter the existing ecosystem (Biggs et al. 2009).

Conducting empirical field research expands field of knowledge and data to work and be able to foresee and have a better understanding about potential regime shifts (Scheffer and Carpenter. 2003). Having a larger database and empirical evidence of various social-ecological rapid changes occurring around the globe would be helpful in understanding the inner workings of regime shifts. In addition, learning more about ongoing social-ecological rapid change could be helpful in recognizing them faster, thus adaptation and mitigation measures can become ready once it happens. To understand regime shifts better, researchers can conduct case study analysis on ongoing social-ecological rapid changes and find out the driving factors that cause regime shifts. Moreover, recognizing social-ecological outcomes that follow regime shifts would be valuable information to grasp in order to understand its impacts. The impacts of regime shift could have both positive and negative effects, so having a closer look at them will shed a light on their effects. If there are negative impacts caused by a regime shift, researchers can work on potential methods to reduce them. One of the ways to reduce negative impacts caused by a

regime shift would be to offer prospective governance and management initiatives that would be beneficial in resolving the problems.

1.2 Problem Analysis

Shifts and changes constantly occur across numerous dimensions in the world. One of the main topics in the regime shift studies is to examine the transformation process when one stable state shifts to another stable state as shown in figure 1.1. Regime shift (RS) examination grew out of the ecological sphere, in order to investigate and understand the causes, driving factors, and processes of change in the ecosystem. The stable state conditions in social-ecological system are reliant on its capacity for self-organization depending on the circumstances and the resilience level, while overcoming constant small scale perturbations. From time to time large scale perturbation shifts the stable state to an alternate stable state condition crossing the threshold barrier (May 1977). In social-ecological system the population stays in between certain limits under relatively stable condition. Then, a sudden external driving factor in the environment shifts the population to an alternate regime crossing the threshold (Scheffer and Carpenter. 2003). For many organisms, the sudden ecological shift produces stressful effects and causes diminished wellbeing. The driving factors for the shift can be a large scale external influence, which is comparatively easier to detect. However, the driving factor can be small, but incremental in nature. Therefore, these smaller incremental driving factors can have as vast an impact as a big external influence. Once, the slow buildup of the force reaches the bifurcation level, the threshold level passes, causing RS (Scheffer et al. 2003).
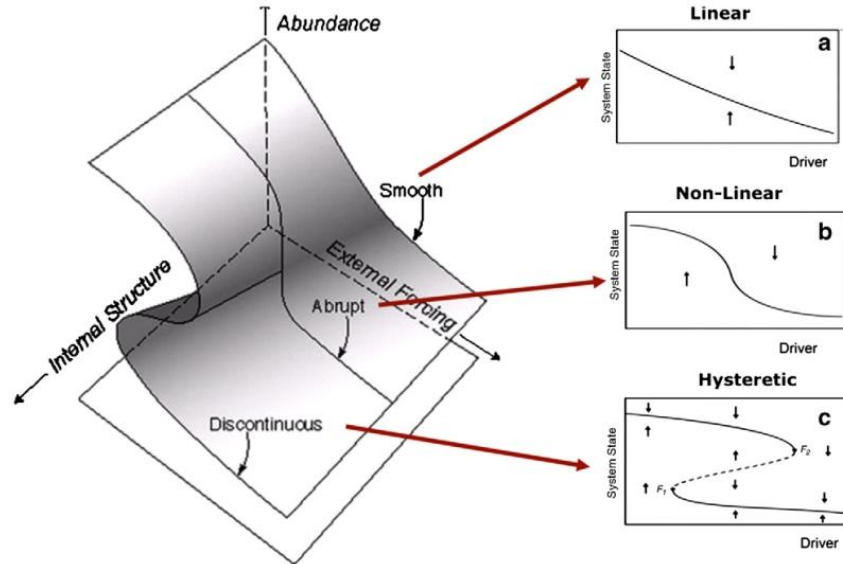
Figure 1.1 – Ecosystem change process. (a) Dynamic ecosystems change in a smooth way under external conditions, (b) or change immensely in response to the external condition (c) or can have more than one stable state. (Crépin et al. 2012)

The slow RS happens on a gradual degree which is why it is easier to miss or overlook. To prevent, prepare and counteract the harmful consequences of the regime shift the slow transitions need to be given equal attention as the larger external perturbation (Hughes et al. 2013). The effects of the perturbation are shown in figure 1.2. RS is often complex in nature involving combinations of reinforcing elements in the ecosystems and society on temporal and spatial scales (Hughes et al. 2013). Many of the current ecological equilibrium states are reaching close to the threshold level due to the human actions. Once the threshold level is crossed, the ecological imbalance occur causing unpredictable outcomes, with a high likelihood of endangering the social systems and its wellbeing (Hughes et al. 2013).
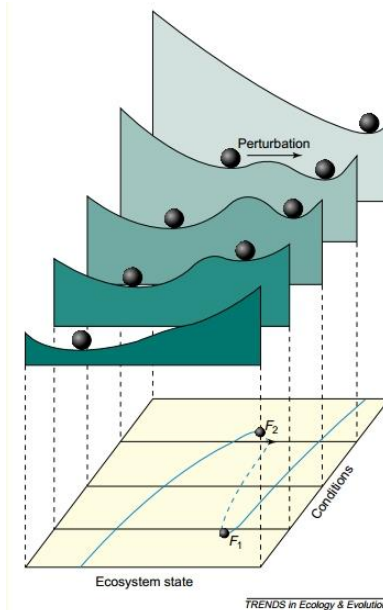
Figure 1.2 – Effects of perturbations on the resilience, threshold and stable states. (Scheffer et al. 2003)

The social recognition of the ecological RS and its connection to the social sphere is the key to understand the complex interconnectedness. In recent years, natural resource exploitation has been increasing for the purpose of meeting ever expanding market demand (Biggs et al. 2009). The social driving factors for RS are increasing, while the knowledge of detection and prevention lag behind. For this reason, the field of RS has to advance. One way to move forward is to improve the RS detection and aversion techniques because once RS occurs reversing it to the previous condition is extremely difficult (Biggs et al. 2009).

To understand the components of the social driving factors of RS and resource dynamics in detail, a social-ecological systems view can be employed. To go deeper into the study of understanding human-environmental connections, a comprehensive and holistic Social-Ecological Regime Shift (SERS) view is instrumental (Nayak et al. 2016). Regime shift's characterization includes qualities such as an irreversible long-term rapid change in social-ecological system that have potential negative impacts to the affected people as well as ecosystem (Biggs et al. 2009). The research on SERS shows SERS can be driven by ecological as well as human activities. Moreover, SERS can have devastating outcomes on the resource

itself and the human society and community (Lade et al. 2013). Likewise, the natural resources and ecosystems analysis need to include inputs from the ecosystem services, resource management, human and ecological well-being studies. The necessity to realize the importance of social-ecological systems view of resource management is evident (Lade et al. 2013). A case study such as this research is useful for better understanding the dynamics of rapid change thoroughly for the purpose of improving management methods suitable for SERS.

In this research social-ecological rapid change in Perhentian Islands are studied to ascertain its driving factors, impacts, potential ways to reduce the negative impacts and other related issues. Moreover, this research strives to understand governance implications on social-ecological rapid change and related attributes. The Perhentian Islands in Malaysia are attracting growing number of tourists from all over the world and this development is endangering the local capacity to keep social and environmental balance. The carrying capacity limit of this famous tourist destination in Malaysia has been over extended to accommodate tourists' demands (Nasir et al. 2017).

1.3 Goal and Objectives

This research thesis discerns the societal driving factors that stimulated social-ecological rapid change as well as its impacts on social-ecological sphere, highlighting the complex system. Furthermore, this thesis identifies and analyzes connections between social-ecological rapid change and the social-ecological systemic attributes such as the equity, and power dynamics.

The goal of this research is to examine key attributes of rapid social-ecological change in the coastal-marine systems and understand their implications for governance.

Objectives:

1) To identify and characterize the nature of rapid social-ecological change taking place in the study site and the driving factors influencing it.

2) To understand various power dynamics that contributes to and results from rapid social-ecological change through power cube framework and then to recognize and analyze the equity concerns inherent in the ongoing rapid social-ecological change.

3) To examine governance implications on ongoing social-ecological rapid change and suggest ways to improve it by applying adaptive co-management as a governance component.

The objectives are designed and formulated to answer the research goal. The first objective of research focuses on understanding the nature of ongoing social-ecological rapid change on Perhentian Islands and the driving factors influencing it. The ongoing social-ecological rapid change on Perhentian Islands have multiple influencing factors from social dimensions which include various institutions and stakeholder groups actively participating in tourism development (Islam et al. 2013). Recognizing driving factors is important because it reveals what is causing the rapid change. Moreover, the driving factors that are causing the rapid change could be comprised of not a single but several components. To understand in-depth details of the driving factors, inherent power dynamics issues can be examined. The second objective of this research is to use power cube framework in order to analyze power dynamics issues in Perhentian Islands and examine potential equity concerns related to the social-ecological rapid change. The detailed understanding of the social-ecological system and power dynamics issues would be helpful in learning about the major stakeholders and their involvement in rapid change. After identifying driving factors and major stakeholders, the existing governance and management mechanisms on Perhentian Islands are analyzed. The third objective of the research is to examine the existing governance and management regulations and propose a potential way to improve its effectiveness by including adaptive co-management elements. For the existing management mechanism, MPA management is used as a focal point because the local Perhentian Islands inhabitants were knowledgeable about it and were willing to give their opinions. This focal point management highlights the importance of understanding social-ecological rapid change and power dynamics to have a better management mechanism. This idea for improvement should come from the local Perhentian Islands' people, because they have the firsthand experience of social-ecological rapid change. In addition, the improvements should focus on both human wellbeing and ecosystem balance, because an efficient governance framework should be able to combine them. Forming a governance and management system capable of handling the rapid change is a challenging task. At this moment, most of the resources on Perhentian Islands are being directed at accommodating the tourism sector which develops physical infrastructures to meet the national and international tourists' demands (Muhibudin and Mohamed. 2014). To

address these issues, MPA management on Perhentian Islands is used as a focal point management example that takes into account social-ecological rapid change and power dynamics.

1.4 Literature Review

Introduction of the theories used to answer the goal and objectives of this research are illustrated in the literature review chapter. This chapter presents theoretical background of Social-Ecological Regime Shift and explains the advantage of including two dimensions in regime shift research. Incorporating both social-ecological dimensions in the research is advantageous because it gives the opportunity to see the problem from multiple angles. In this case study, there are social-ecological factors that cause and result from social-ecological rapid change on Perhentian Islands.

In order to analyze factors affecting regime shift from the social dimension, power dynamic issues in Perhentian Islands were studied. The power dynamics factors were examined using power cube framework and theoretical background of this framework is introduced in this chapter. The power cube framework is a useful tool to analyze power dynamics because it is capable of studying power in a systematic way. The power cube framework has three main categories such as place, space and forms of power to explain a particular power dynamic issue (Gaventa. 2005). Examining power dynamics issues can be beneficial in providing insights regarding both positive and negative social-ecological rapid change impacts. The last objective of this research is to examine implications of existing governance structure and provide a potential suggestion to improve it by applying adaptive co-management as a governance component. For this reason, a theoretical introduction of the adaptive co-management theory is provided. One of the advantages of adaptive co-management and the reason for using this management method is because it highlights the importance of stakeholder collaboration. Moreover, adaptive co-management emphasizes versatility and capability of managing cross-dimensional issues (Armitage et al. 2008). Social-ecological rapid change issues in Perhentian Islands have cross-dimensional characteristics and involve multiple stakeholders. In order to understand on-site management and governance mechanisms MPA management was used as a

focal point. This focal point management analysis helps to understand management's relevance to social-ecological rapid change and power dynamics.

1.5 Research Area and Methods

This chapter starts with a brief introduction of the Malaysian history section to give information regarding local culture. Understanding Malaysian culture is important because it helps to see social values from the local people's perspective. Moreover, understanding local cultural values are important in order to recognize some of the social driving factors leading to social-ecological rapid change.

The following section introduces the research area and methods used in the research. The research was conducted in Perhentian Islands, Malaysia with local villagers. The research site was located at the northeastern coast of peninsular Malaysia, famous for its coral reef ecosystem. The Perhentian Islands are situated around 20 km from the Terengganu state on the northeastern coast of Malaysia. There are two large human inhabited islands Kecil 524 and Besar 867 hectares respectively, and several smaller islands constituting the Perhentian archipelago, a breeding and nursing ground for the coral reef, turtles and 127 fish species (Islam et al. 2013). Malaysia has $3'200$ km^2 coral reef area and most of it has come under the jurisdiction of Marine Protected Area (MPA). In Perhentian Island, the MPA jurisdiction was established in 1994 to protect the coral reef habitat (Islam et al. 2013).

The Perhentian Islands' MPA was initially pioneered by the Department of Fisheries Malaysia (DoFM), and then the responsibility transferred to the Marine Parks Department Malaysia (MPDM) to promote tourism in the protected area. MPDM is a department under the Ministry of Natural Resource and Environment (MNRE) which makes it part of the federal government (Islam et al. 2013). The no fishing zone of the MPA was established within 2 nautical miles around the shore which is a federal government regulation. At the same time, the land area and the developments on top of the island are under state government jurisdiction (Islam et al. 2013). While all of the policy decisions were being formulated, the ethnically-local Malay fishing village Kampung Pasir Hantu members on the Kecil Island had practically no

voice over the matter (Islam et al. 2013). This indicates the low-level stakeholder participation in decision making. There are several stakeholders who can be involved in discussions of the MPA issues. The potential stakeholders are federal government, state government, tourism industry and local villagers. The political and policy decision-making process had minimal representativeness of the villagers (Islam et al. 2013). By the same token, the power dynamics of the groups are unequally distributed, strongly in favor of the tourism industry, federal and state governments (Islam et al. 2013).

The researchers have identified the human actions and specifically growing tourism industry ventures and the infrastructure growth as the main driving factors for the coral reef ecosystem damages (Hawkins et al. 1993). On top of that, the MPA arrangement has restricted access to the protected area, particularly affecting local stakeholders whose livelihood depended on fishing. This situation puts the fishermen in a difficult position and forces them to change the customary lifestyle followed by the previous generations (Islam et al. 2013). From the study, local fishermen did not stay inactive and in fact suggested several propositions to make the situation better and one of them was a suggestion to construct artificial reefs (AR) surrounding the MPA area to aid the fishery (Islam et al. 2013). Nevertheless, the small-scale and artisanal fishers' income and economic well-being didn't advance by constructing AR in the coastal peninsular regions in Malaysia largely due to the inability to exploit the effective fishing methods involving large engine boats (Islam et al. 2014).

The villagers' well-being and the traditional fishing livelihood support system have been undermined by the federal government decision to establish MPA. The no fishing zone extends 2 nautical miles surrounding the islands and prohibits the fishermen to sustain themselves adequately. Some of the villagers resorted to breaking the law by fishing in the no fishing zone (Islam et al. 2013). Theoretically, the tourism industry could provide jobs for the villagers, but in reality, the jobs are seasonal, thus have a systemic sustenance limiting characteristic (Islam et al. 2013). The local fishermen use hook and lines, traps, gill and drift nets and trawl nets using small boats in the short distances (Islam et al. 2013). They fall short of financial means and capacity to engage in the further distance fishing, outside the 2 nautical miles (Islam et al. 2013).

On top of that, the protection of the coral reef habitat in the no fishing zone is in danger because of the growing tourism related activities in MPA (Islam et al. 2013). The respondents in

the research have pointed out the number one reason for the coral reef ecosystem destruction is the littering and waste caused by the growing unsustainable tourism (Islam et al. 2013). The Perhentian Islands' village and a well-known tourist spot Long Beach are shown in figure 1.3.

Figure 1.3 – Perhentian Islands' village and Long Beach. On the left side is Long Beach a popular tourist destination and on the right side is the village on Perhentian Kecil.

The ongoing rapid social-ecological change in the Perhentian Islands have been aggregated by the uncoordinated governance mechanism between the stakeholders such as federal and state governments dealing with the MPA and tourism sector's influence on the local population. The problems of communication, coordination, overlapping roles, and policy synchronicity in the levels of government have been observed (Islam et al. 2013). The governance and management policies have to address the tourism sector's regulations to make it more sustainable for the long run.

After introducing the research site, this chapter explains the methods used to do the research. Conducting research on Perhentian Islands and finding answers to the research goal and objectives required a mixed method approach. A two phased sequential explanatory mixed method approach was used in this research, which is characterized by collecting quantitative data first and qualitative data second (Creswell 2014). The quantitative first phase focuses on capturing people' opinions using the Likert survey because it is useful in capturing people's opinions (Likert 1932). The qualitative second phase of the research is used to provide detailed information on the data collected in the quantitative first phase (Domínguez and Hollstein. 2014). In the second qualitative phase, focus group discussions were held. The focus group is used to find out participants' in-depth opinions and perspectives on the research subjects

(Bryman and Edward. 2016). Following the data collection, a thorough data analysis was done to answer research objectives.

1.6 Significance and Relevance

The significance of this research is to reveal potential SERS case on Perhentian Islands then address power dynamics issues between the stakeholders and propose a management option as a component of governance to improve the existing situation. The expansion of tourism related activities on Perhentian Islands show signs of social-ecological rapid change. In addition, the increasing degree of tourism related activities are identified by the local research participants as a main cause of social-ecological rapid change. This research examines and shows the factors that act as driving forces leading to rapid social-ecological change, and its consequence on society, particularly with respect to the identified social groups existing on the islands. Moreover, power dynamics analysis of the social groups involved in various levels and scales of tourism development activities reveals insights that help to understand who are benefitting and who are losing from the rapid change. In addition, analysis of social-ecological impacts of potential SERS case shows the consequences of rapid change and provides data that assists in proposing management mechanisms to reduce the negative impacts. One of the main characteristics of the management mechanism that is suitable for social-ecological rapid change is the capability to respond to uncertain changes because many of the problems caused by SERS are hard to predict. This in-depth Perhentian Islands' potential SERS case study can be a valuable example for comparison with other potential SERS cases to reveal common issues or unique differences for the further study.

1.7 Thesis Structure

This thesis consists of six chapters. The first chapter introduces the problem analysis, research goal and three objectives. Also, it provides a concise overview of study area, methods used, and literature review. The second chapter presents theoretical literatures used in this thesis

and establishes a conceptual basis of the research. Major theories used in this research include SERS, power cube framework, and adaptive co-management. The third chapter describes the Perhentian Islands in Malaysia and explains the progress of tourism development. Additionally, the third chapter explains a two phased sequential explanatory mixed method approach used in this research. In addition, brief Malaysian historical literatures are included to explain some of the cultural values. The fourth chapter presents research results from the case study in Perhentian Islands. The results data show the social-ecological rapid change impacts, driving factors and power disparities between stakeholders. The fifth chapter takes research results from the previous chapter and discusses them point by point according to the framework in figure 2.1 and the three objectives. In this chapter prior to discussing objectives a brief theoretical analysis is presented to connect conceptual framework with detailed research results. This chapter begins by introducing the nature of potential SERS case on Perhentian Islands, and then goes into stakeholders' power relations in the context of tourism development. Then research participants' opinions to improve the existing management mechanisms on Perhentian Islands are mentioned. These opinions suggest potential options that can be useful to better cope with social-ecological rapid change. Those mentioned inclusions in management can be viewed as a component of overall governance initiative to reduce the negative impacts of SERS. The sixth chapter broadly summarizes the thesis outcomes and conclusions, then presents contribution of the research and provides research recommendations.

CHAPTER 2

Literature Review

2.1 Introduction

This chapter focuses on providing and explaining theoretical literatures and introducing major documents related to the research. First section provides literatures on SERS and Perhentian Islands. The literature on SERS and social-ecological rapid change is essential for answering the first objective which identifies potential SERS on Perhentian Islands. To answer the second objective, the literatures explaining power dynamics and the fields that clarify the driving factors are presented. Among driving factors particular attention is given to the power dynamics to convey the importance of stakeholders in Perhentian Islands. The pieces of literature relevant for the third objective are included in the section describing governance and management approaches.

The major economic contributors in the Terengganu state - where Perhentian Islands are located - include farming, tourism development and fishing industries. The Perhentian Islands and its tourism sector development are reviewed to present the details of the ongoing rapid change. The social-ecological rapid change details are analyzed through the social-ecological regime shift theoretical angle and the corresponding pieces of literature are presented. In this section, the focus is on regime shift and its progress. In this research, the social-ecological regime shift theoretical view is used to include both social-ecological dimensions in explaining regime shift process. By following and collaborating cross-disciplinary approach, this research aims to include social-ecological factors that can be related to ongoing social-ecological rapid change. From the social dimension's perspective, a factor such as power dynamics is explored. Power dynamics can be an influential factor related to the social-ecological rapid change (Nayak et al. 2016). To analyze and explain power dynamics, the power cube framework is used (Gaventa. 2006). Moreover, the advantage and reason for using power cube framework is based on its capacity to review power dynamics systematically. Power cube analyzes space, level and forms of power (Gaventa. 2006). Power dynamics in the Perhentian Islands is analyzed using

power cube framework to analyze power holding stakeholder groups and their influence in tourism development. The forms of powers in the Perhentian Islands context have a distinctive connection to economic development and cultural values.

After that, the governance and management literatures are covered. Among them adaptive co-management approach is introduced as a governance component to manage SERS in the Perhentian Islands. The literatures on management are included to explain the adaptive co-management concepts and importance of social learning and enhanced co-operation between the stakeholders (Armitage et al. 2008). For a governance and management framework focused on maintaining long-term development, natural habitat and societal well-being co-operation between the stakeholders is an important factor.

2.2 Social-Ecological Regime Shift

2.2.1 Theoretical Development

To understand ongoing social-ecological rapid change on Perhentian Islands, it is important to have background information about the location and events. This section provides theoretical literatures on regime shift. Regime shift happens due to an incrementally small driver or a single large-scale driver shifting the equilibrium state crossing the threshold level (Scheffer and Carpenter. 2003). For Perhentian Islands' case, the gradually intensifying tourism development activities over past decades are studied as the potential driving forces behind social-ecological rapid change. In some instance, the factors that lead to RS slowly build up over the years and a sudden push occurs shifting an existing stable state to a new state (Biggs et al. 2009). Having a theoretical understanding of RS is useful because it explains the need to analyze both social-ecological driving forces that lead to rapid change. Furthermore, RS has a potential to cause unpredictable social-ecological impacts. Some of the definitions of RS are mentioned by Crépin "We define a regime shift as a substantial reorganization in system structure, functions and feedbacks that often occurs abruptly and persists over time" (Crépin et al. 2012). Ecological RS can have impacts on social dimensions "Ecological regime shifts are large, abrupt, long-lasting changes in ecosystems that often have considerable impacts on human economies and

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societies" (Biggs et al. 2009). The RS theory describes a systemic sudden shift (Scheffer and Carpenter. 2003). RS is described as a long-term and irreversible social-ecological rapid change that has potential to cause social impacts (Nayak et al. 2016). On Perhentian Islands, the social-ecological rapid change drivers are mostly from the tourism sector and social groups participating in the business activities. There are other examples of such swift environmental changes. One such example is the coral reef system in the Caribbean undergoing RS because of the algae growth reinforced by the incremental small additions of the gradually accumulating nutrients (Scheffer and Carpenter. 2003). Figuring out the details of the RS and its driving forces causing the population or system to cross the threshold or tipping point is an essential task to prevent or manage the RS. Once RS happens, returning to the previous condition is extremely difficult (Hughes et al. 2013).

Identifying the impacts caused by Perhentian Islands' social-ecological rapid change is a challenging task since it is still going through rapid change. Moreover, Perhentian Islands have multiple stakeholders involved in tourism related business activities that could potentially be impacted by social-ecological rapid change. Predicting and averting RS's negative impact are considered a preferable option, given that the new stable state creates a number of uncertainties that might jeopardize the flora and fauna that existed in the previous state (Prowse et al. 2014). This research was conducted to give a clear picture of Perhentian Islands' social-ecological rapid change and an understanding of the related factors and variables. Analyzing various indicators to have a better predictive capability of the threshold level and diverse driving factors of RS could be a practical strategy to pursue in order to understand RS (Biggs et al. 2009). The demand for the improved methods and models of understanding RS is expanding with the necessity to quantify the effects and impacts of the human-induced ecological change. There are notable examples of human-induced ecological change such as climate change which proves human involvement can be connected to ecological change (Stafford et al. 2013).

For this research, identifying anthropogenic driving factors and analyzing their relevance to social-ecological rapid change will reveal insights of its progression. The research analyzes the anthropogenic driving factors such as tourism development to improve the capacity and know-how of assessing the available data and derive assumptions and interpretations of the features triggering the social-ecological rapid change. On top of identifying driving factors leading to RS, identifying threshold is a challenging task "In ecology, regime shifts between

alternate states are often considered to be synonymous with sudden flips or abrupt ecological surprises. Consequently, most of the ecological literature on regime shifts assumes that thresholds or tipping points are easily recognized once they have been surpassed, because an unstoppable and rapid transition to an alternate state will immediately ensue. Here, we argue that, contrary to conventional wisdom, transitions between ecological regimes often unfold over decades, centuries, or longer, with major consequences for our capacity to detect, avoid or reverse them" (Hughes et al. 2013). It is a crucial step to identify a threshold or multiple thresholds in researching social-ecological change. In this research threshold is difficult to identify because the social change in Perhentian Islands is still continuing. Threshold is defined as a breakpoint "we adopt a broad definition of a threshold as a breakpoint between two regimes of a system" (Walker and Meyers. 2004). For Perhentian Islands' case, identifying a definite breakpoint that separates two systems is a challenge because social changes driven by tourism sector development are still going on. In order to understand ongoing social-ecological changes, the social dynamics, as well as ecological forces can be analyzed (Lade et al. 2013). Moreover, studying SERS attributes can be helpful in understanding the social system attributes in multiple scales (Nayak and Armitage. 2018).

Analysis of human and natural systems' dynamics and their interdependent connections are pivotal for understanding complex topics such as social-ecological rapid change. This cross-sectoral research on Perhentian Islands strives to answer the research goal and objectives by having a holistic view of SERS. Some of the definitions attributed to SERS include abrupt, long-term, and significant changes connected to ecosystem services and human wellbeing "We define social-ecological regime shifts as abrupt, long-term and significant changes in linked systems of people and nature with uncertain implications for ecosystem services and human wellbeing" (Nayak and Armitage. 2018). One of the key attributes of SERS is to study both social-ecological factors when researching social-ecological changes "A social-ecological perspective emphasizes the integrated concept of humans in nature and stresses that the delineation between the social and the ecological is artificial and arbitrary" (Nayak and Armitage. 2018). By combining social-ecological dimensions in research a wholesome understanding of the issues could be obtained "This perspective has important consequences for how we anticipate, interpret and respond to regime shifts (RS)" (Nayak and Armitage. 2018). Definitions of RS, SERS and threshold are presented in table 2.1.

Table 2.1 – Definitions related to social-ecological change

Concepts	Definitions	Adapted from
Regime Shift	We define a regime shift as a substantial reorganization in system structure, functions and feedbacks that often occurs abruptly and persists over time.	Crépin et al. 2012
Social-Ecological Regime Shift	We define social-ecological regime shifts as abrupt, long-term and significant changes in linked systems of people and nature with uncertain implications for ecosystem services and human wellbeing.	Nayak and Armitage. 2018
Threshold	We adopt a broad definition of a threshold as a breakpoint between two regimes of a system.	Walker and Meyers. 2004

There are other examples of cross-sectoral studies that explain complex problems such as the environmental resilience loss and flooding events triggering demographic disruption, thus resulting in migration and vulnerability (Wrathall. 2012). This example shows the possibility of environmental condition affecting individuals' well-being, and indicates the potential existence of harmful social-ecological impacts of rapid change. To counteract the negative consequences of Perhentian Islands' social-ecological rapid change on the human well-being within and across generations, the governance and mitigation techniques need to take into account the existing complexity. One way to reduce negative impacts related to RS is to incorporate empirical research and understanding of the rapid change into management mechanism (Crépin et al. 2012). By the same token, in the social contexts exploring mechanisms and operational nuances of the underlying power structures can shed a light on the social-ecological system's driving factors prompting social-ecological rapid change.

2.3 Power Dynamics and Equity

2.3.1 Power Cube Framework

To draw a picture of the events and driving factors related to SERS it is important to study both social-ecological dimensions (Nayak and Armitage. 2018). Moreover, examination of

human-environment interactions and evidence of factors leading to social-ecological imbalance can explain ongoing social-ecological rapid change on Perhentian Islands. The power dynamics play an influential role on the existing driving factors that cause RS (Nayak et al. 2016). One of the reasons that the power dynamics can be an influential factor behind SERS is because some of the ongoing ecological changes contain anthropogenic influence and various stakeholders. In a similar way SERS may create an unequal social condition where stakeholders benefit differently from the tourism development. In this kind of situation, some stakeholders experience the burden of rapid change while others benefit from the social-ecological system disparity (Nayak et al. 2016). Studying power dynamics assists in understanding SERS driving factors and corresponding impacts felt by the stakeholders.

Understanding power dynamics can be useful in order to explain the power dynamics on Perhentian Islands. The inside-in perspective of the power puts emphasis on the insiders view to understand the power. The outside-in perspective inspects external factors of influence and analyzes the power in terms of ideas (Morris et al. 1999). The inside-out perspective of power grows out of the case studies that emphasize distinct instances of internal factors guiding the decision making to influence outsiders (Morris et al. 1999). Examining power dynamics from the agent view assists in understanding the different kind of power holders. The agent view underlines the distinct power-holding individuals and groups who utilize it over others by way of coercion and constraint (Pelling and Navarette. 2011). Additionally, the social power is understood as composition of social structures and individual actors or their mix of combinations. The political systems and the personalities in the system exert power, temporarily holding authority according to their positions (Pelling and Navarette. 2011).

On Perhentian Islands, power dynamics is an influential factor of social-ecological rapid change and influences how stakeholders receive benefits from tourism-related activities. Analyzing the social power balance is an important step for identifying various stakeholders and their connections to the tourism development. Studying the implications of spaces and levels of power is useful for characterizing its dynamics in international, national, and local scales. In some instances power dynamics operate in vertical direction (Gaventa. 2005). A formation of an alliance between social groups in both horizontal and vertical directions could improve the participation and engagement of the different actors in social activities (Gaventa. 2006).

Global tourism trend has some influence on increasing the number of international tourists visiting Perhentian Islands. This trend extends to international actors' reach and access in the local markets. This social economic change has the potential to uplift the living standards while saving the ecological systems. At the same time, social change can also create power imbalances, human misery, and ecological degradation, unless appropriately managed (Armitage. 2007). There are other examples of national and multi-level driving factors influencing diverse local ecological calamity. One example of vertical power structure's inability to be inclusive of lower level stakeholders' opinion in decision making can be seen in the national level economic policy directed agricultural expansion and infrastructure development, that in turn caused local tropical deforestation (Geist and Lambin. 2002). The notion of multi-level interaction takes the form of top-down procedure, where higher level agents exercising power over lower levels. In other instances the influence can go in both directions, in other words, the bottom-up process is feasible and proven by the empirical evidence (Folke et al. 2005).

This research employs power cube framework to analyze power dynamics in tourism related activities on Perhentian Islands. The power cube framework has three major conceptual categories and those are space, place and forms of power (Gaventa. 2005). These categories are further divided into the respective subcategories. The place category describes the levels where stakeholder players and agents come in contact and set up arrangements to exercise power. Levels are divided vertically for example household, village, province, national and international levels, as well as networked organizations (Gaventa. 2005). This research emphasizes local village level events and local level power dynamics. By the same token, relevant higher level power dynamics and connections are given equal attention. Space dimension has subsections closed, invited and claimed (Rabé and Kamanzi. 2012). These spaces indicate the arenas where power holders engage in activities and make decisions aligned with their interests. The closed space may refer to the arena where decisions and actions are made by the specific group without including the public and various stakeholders (Rabé and Kamanzi. 2012). The invited spaces are created once stakeholders are invited or called into the decision-making arena and/or following implementation procedures. The invited space refers to the arenas where government or other authoritative body allows participants to be actively involved in the ongoing proceedings (Whaley and Weatherhead. 2014). The participation in these proceedings could be in local, national and international levels. The claimed space refers to a created space. The claimed space

is developed in the situations when some of the stakeholders feel excluded from the ongoing discourse hence form their own space to act for their own interests (Gaventa. 2003). The claimed spaces are created as a result of a particular group being excluded from the participation in a specific activity, henceforth this group creates its own space to engage in activity (Whaley and Weatherhead. 2014).

The forms of power dimension have visible, hidden and invisible subsections (Gaventa. 2006). Each subsection explains how power is exhibited or demonstrated. The visible form is distinguished when related actors and agents openly make decisions and act publicly, without hiding their actions. The power demonstrated in a visible way may indicate the power holders are engaging in open and public processes. Moreover, in visible demonstration of power, the power holding actors' successes and failures are observable by the bystanders (Njaya et al. 2012). The hidden form of power happens when groups and actors influence or make decisions privately, with minimal or no exposure to the public. For the hidden form of power the actions taken by the power holders are not observable by the third party. There is an exclusionary barrier between public and the group exercising the power (Whaley and Weatherhead. 2014). Although hidden form of power is exclusionary, its activities are recognizable. An invisible form of power denotes a type of influence embedded in the culture and ideology followed by the society (Njaya et al. 2012). An example of invisible power is a religion because its norms and standards have an influence on people's behavior and belief. The hidden form of power functions through instilling values and ideologies in society thus it is harder to recognize. The people working under this form of power might not be able to realize they are being influenced, because the ideological values are instilled in the culture and way of life (Idler et al. 2015).

The power cube framework could be useful for providing support and improvement to the efficiency of governance and management procedures in Perhentian Islands. The advantage of using power cube framework is that it provides power dynamics analysis which might be useful in the management process (Njaya et al. 2012). The power cube framework can provide additional elements in the better governance and management that have a supportive role of examining various actors' capability in participation processes. The power dynamics, social-ecological regime shift and governance and management processes are graphically presented figure 2.1. The connecting lines represent theoretical concepts' connections and interconnectedness. This means a change in one section can have a reaction in the other sections.

The social-ecological rapid change isn't a static condition but an active dynamic process. Furthermore, the changing societal processes are not linear in nature, but highly complex.

2.3.2 Equity Concerns

The equity concerns regarding stakeholders in Perhentian Islands in this research are focused on the possibility of equitable distribution of wealth between stakeholders. Equitable distribution of resource can become this generations' duty to preserve the natural resource base for the future generations (Okereke. 2006). There are instances of equity concerns in fishing communities (Marshall. 2001). This research focuses on equity distribution costs and benefits concerns growing out of power dynamics. Power dynamics factors in social-ecological rapid change on Perhentian Islands could be affecting stakeholders differently. RS affects social groups differently in a sense that costs and benefits are distributed unevenly (Lade et al. 2013). In order to govern the RS situation effectively, the recognition and attention should be given to the equity concerns (Nayak et al. 2016). This means having better understanding of equity concerns could be useful in improving social-ecological rapid change governance and management mechanisms. The multiplicity of factors can cause a collapse of social-ecological systems and communities resulting failure of the preexisting social co-operation and standards (Lade et al. 2013). An example can be found in the development in the fisheries industry that had reshaped local social-ecological system, causing a condition of misunderstanding between the stakeholders. Resource use rights' disputes and communication problems undeniably prosper between the new and traditional users of the existing natural resource and this disagreement reveals different perspectives of resource utilization. In most cases, traditional resource users possess lower financial capital than new users and the monetary difference impacts the issues of access rights and related conflicts in fisheries management (Gasalla and Gandini. 2016).

Perhentian Islands' villagers are traditionally fishers and their lifestyle revolves around fishing. Presently, the small-scale fishers are considered one of the poorest and vulnerable communities (Béné et al. 2011). The resiliency of the small-scale fishers depends on the degree of adaptability to the uncertain forces that can occur anytime. The capability to absorb external stress has a direct connection to fishers' chance of overcoming the impoverishment (Béné et al. 2011). Not all causes of small-scale fishers' misery can be decided easily. The small-scale fishers

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can be negatively affected by a legally binding international business agreement and this force may cause loss of resource use and accessibility rights. The traditional resource users lack by a large margin knowledge or skill to act on an international level and follow up business deals. Although, internationally 22 million small-scale fishers operate 90% of all fishing boats, they have a less than sufficient voice in the marine resource decision making (Saunders et al. 2016). High-level policies being legally sanctioned do not guarantee that these documents will not harm marginalized groups. An example of high-level decision-making hurting the small-scale fishers can be seen in the government's increased lease fee for fishing rights, an economic instrument to marginalize the villagers, while staying within the legal limits (Nayak and Berkes. 2010). Likewise, sidelined groups can be harmed by RS when it unbalances the resource distribution rights within and between generations. This disparity between social groups may usher future conflicts over resource management rights (Crépin et al. 2012).

Perhentian Islands' villagers have a wish to be involved in governance and management activities that are related to their lifestyle. There are examples of vulnerable groups obtaining rights to participate in management activities. One of the theoretical examples where equity and environmental concerns are taken into consideration is environmental justice. The environmental justice approach combines environmental and social justice concerns for the betterment and allocation of equal benefits to all stakeholders (Agyeman et al. 2002). The environmental justice actively engages in topics such as equity concerns connected to environmental and ecological safety. Environmental justice literature has roots in civil rights activities and social justice movements in the USA over housing hazards in racially divided neighborhoods. The housing hazards were connected to various adverse health effects associated with chemical toxicity (Bullard and Johnson. 2000). The academic community recognized the importance of this theory when researchers in those days discovered toxic waste landfills were located in predominantly black neighborhoods and connected the dots between social status and environmental hazards (Beltrán et al. 2016). These findings proved that the environmental concerns can be related and connected to the societal issues.

2.4 Social-Ecological Regime Shift Governance

2.4.1 Adaptive Co-management as a Component of Governance

A governance mechanism can be employed to reduce negative impacts of SERS. The governance is defined in this research as a public and private interactive activity to tackle challenges and create opportunities in society (Armitage et al. 2008). This means governance activities promote public and private cooperation. Moreover, governance activities support the formation and implementation of the regulations that promote public and private cooperation. A governance approach that includes learning and knowledge sharing aspects could be effective to face challenges in social and biophysical systems inherent in RS (Nayak et al. 2016). This means there is a need for an effective governance approach to deal with social-ecological issues that cause and grow out of RS. Moreover, some of the governance mechanisms in study site could be a driving factor leading to RS, thus altering those shortcomings related to governance can be a useful step manage RS.

In this research adaptive co-management approach as a component of governance is chosen to suggest ways to face challenges related to social-ecological rapid change in Perhentian Islands. Adaptive co-management approach combines principles of adaptive management and co-management (Armitage et al. 2008). Furthermore, this management approach can be employed to prevent and reduce negative aspects of social-ecological impacts of rapid change by encouraging co-operation and learning activities between the stakeholders. Adaptive co-management could be used to encourage co-operation between stakeholders that were non-cooperative. Encouraging co-operation between parties can be a positive step to improve existing governance mechanism. The following characteristic qualities of adaptive co-management suggest that this management approach could be a satisfactory approach used in a RS situation. One of the advantages of adaptive co-management is that it can bring together antagonistic stakeholders and encourage collective decision making. This is an important step because the lack of co-operation between stakeholders can be a factor leading to RS. Governance and management mechanism suitable for RS should encourage participation in decision making and be inclusive of diverse views (Nayak et al. 2016). Governance mechanism for RS should address the importance of managing multilevel actors, responding adaptively to the changes, and learning collaboratively (Nayak and Armitage. 2018). This means management mechanism suitable for RS should emphasize human well-being by providing opportunities for the stakeholders to voice their opinions and work in cohesion. Adaptive co-management approach fits to these criteria

because it encourages knowledge sharing and collaboration between the stakeholders to face multi-level challenges. Another aspect that makes adaptive co-management suitable for RS is the emphasis on equitable distribution of costs among the stakeholders for the long term benefit. Equitable distribution of costs fosters enhanced capacity for adaptation (Armitage et al. 2008). Furthermore, as any other policy and management topic concerning various groups of people, RS management has to give attention to the social and economic policy elements. This position is accentuated by the fact that social groups do not share equal volume of costs and benefits generated by RS (Crépin et al. 2012). For this reason, RS management should include mitigation and adaptation components to reduce unfavorable societal and ecosystem service provisioning impacts on population (Crépin et al. 2012).

An adaptive co-management approach can be used to resolve social-ecological system problems and be able to address cross-dimensional issues by encouraging all the stakeholders to participate in management activities in Perhentian Islands. Adaptive co-management approach is equipped to deal with cross-dimensional problems and offer solutions for the social-ecological matters by collaborating and learning procedures (Armitage et al. 2008). Adaptive co-management aims to enhance the social-ecological resilience of cross-dimensional systems to provide functional management activities and processes (Islam et al. 2017). Adaptive co-management promotes stakeholders' ability to learn and be flexible to the severe social-ecological situations making it a suitable management approach for a rapidly changing setting. The importance and pragmatism of stakeholders' cooperation can be seen in the fisheries co-management and this collaboration demonstrates the capacity to meet stakeholders' claims (Schultz et al. 2011). Co-management promises an opportunity to the involved parties, the equal chance to voice their opinions. Moreover, it provides a chance for the previously under-represented members of the community such as small-scale fishers to be included in the discussion, thus making the management process accessible.

Adaptive co-management can be applied in the coastal regions such as Perhentian Islands experiencing social-ecological issues involving multiple stakeholders. The adaptive co-management approach focuses on advancement of management and decision-making processes (Armitage et al. 2008). The various interplay between stakeholders such as government actors, private businesses, non-government organizations, and resource users' for the better collaborations and arrangements have been practiced and continue to progress in the

management study (Schultz et al. 2011). The co-operation between these mentioned stakeholders is crucial to overcome challenges of RS. On the other hand the lack of co-operation between the stakeholders could be a factor leading to RS, because it is a sign of mismanagement and ineffectiveness of the existing governance mechanism. The ecosystem services management focuses on empowering the local community resource users by involving them in the management discussion. Additionally, diverse protected areas management design, creation and operation practices in a participatory arrangement are studied depending on the unique situation where position, scope, and boundary rules apply (Islam et al. 2017). In the coastal marine setting, management approaches generating trust between the management players and collaborative decision making mechanisms have been studied (Armitage et al. 2011). The major objectives of these management structures are building institutions managing the community-based management, developing and clarifying the territorial resource accessibility and user rights. Furthermore, the management should focus on strengthening the institutional capacity for overcoming regularly occurring economic and political challenges by enhancing monitoring and evaluation capabilities of the associated parties (Chapman et al. 2016).

In the time of social-ecological change, the management needs a high degree of adaptability to sustain the resilience of the social-ecological systems and endeavor to safely manage the transformation process (Armitage et al. 2011). The ecosystem-based management approach recognizes complex adaptive systems, the close connection of the human-environment systems and human decisions on the ecosystem (Cundill and Christo 2009). Recognizing fisheries and in particular small-scale fishery as complex adaptive systems can become a fundamental step to improve the management and find solutions to the existing problems and facilitate the adaptation process (Cundill and Christo 2009). To initialize adaptive co-management in practice the bridging organizations can provide an essential supportive role in connecting the stakeholders (Schultz et al. 2011).

2.4.2 SERS Governance Framework

The proposed governance approach designed for SERS in figure 2.1 includes adaptive co-management and power dynamics principles. In other words, it is sensible to the intricate power dynamics nuances and stakeholder participation in SERS governance. The adaptive co-

management mechanism should be modified depending on the location and culture, not to mention, being able to identify the best timing to initialize the policy change in relation to the attributes influencing SERS process. The governance for SERS takes into account the dynamic nature of the complex systems and attributes. The underlying social, cultural and power dynamics basis are considered to be the important factors due to their influence in SERS and related management processes. Stakeholders from various levels including local level governance representatives, the private sector, interest groups, and individuals should all have their voice in the multi-stakeholder decision making and have monitoring rights to the management processes. The power dynamics between the members could become a discussion point and the outcome of the negotiations can be reflected in the management process. The equity concerns also should be analyzed and if any discrepancy or diversion from the initial plan or agreement be detected, a report indicating the issues should be prepared for further action.

SERS governance framework in figure 2.1 represents interconnected concepts directing the research findings. This framework directs research findings regarding social-ecological driving factors and social-ecological impacts connected to SERS in the study site. This SERS governance framework includes adaptive co-management and power cube framework. Moreover, power dynamics analysis that uses power cube framework is helpful because it analyzes stakeholders in Perhentian Islands. Stakeholder power analysis is used here to support adaptive co-management and understand factors related to SERS. Adaptive co-management could be made more effective by including information about stakeholders' power dynamics in the study site because understanding power dynamics of the stakeholders could be a valuable step to support stakeholder participation and knowledge sharing. In total, the concepts mentioned in this framework aim to promote methodical SERS governance. This is a framework option designed to advance SERS governance literature. However, it does not promise to correct every single issue related to SERS. This framework in figure 2.1 guides research results in chapter 4 and discussion in chapter 5 which examines 3 research objectives.
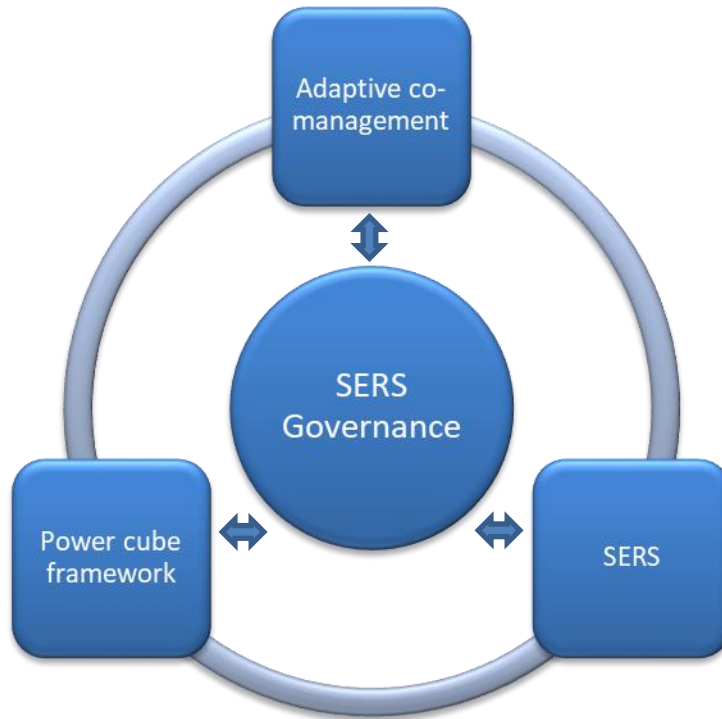
Figure 2.1 – This SERS governance framework represents an interconnected design that has parts such as: SERS, power cube framework and adaptive co-management as a component of SERS governance. The connections between the concepts depict inclusive and reciprocal relationship between the corresponding concepts.

CHAPTER 3

Study Area and Methods

3.1 Study Area

3.1.1 Background Information on Malaysia

This section focuses on providing historical and cultural information about Malaysia. Having historical and cultural information about Malaysia is important in order to understand social dynamics in Perhentian Islands in subsequent chapters. The relevant background information on Malaysian historical, political, religious and economic perspectives is introduced to make Perhentian Islands' social dynamics easier to understand. The reason for introducing the historical works of literature is important because knowing local social value is beneficial for understanding power dynamics in Perhentian Islands. The stakeholder groups in Perhentian Islands are distinguished by various social and ethnic differences that are formed during Malaysian history. Therefore, having a historical knowledge is important to understand their differences. Malaysia experienced numerous challenges in its history including colonization, various wars, and ethnic conflicts while trying to move forward as a nation. After the independence also known as Hari Merdeka, Malaysia experienced economic success as well as environmental and social issues which need to be addressed.

Malaysia has a long and rich history. The history of the Malay people begins from various Rajas or Kings establishing their own territories, cities and farming land across the Strait of Malacca, around Peninsular Malaysia. During the existence of the many kingdoms and colonizers, the Malaysian identity started to form with distinct language, religion, form of trading, farming practices and way of life (Gabriel 2015). The land where current day Malaysia is situated was a major maritime trade route and home of multi-ethnic groups "It was a region where both Malays and peoples from the Netherlands, Portugal, Yemen, South Asia, Indochina, Southwestern China, Japan and the many and varied regions of the Indonesian Archipelago met and mingled. It was also home to many of these communities – indigenous peoples, Malays, Bugis, Javanese, Sumatrans, Chinese, Europeans, Tamils, Parsees, Gujaratis, Bengalis, and

Hadhramis" (Gabriel 2015). Modern Malaysia takes its root from the time when movements designated to anti-colonial activities. Although a number of superpowers colonized the kingdoms situated in Malaysia, the last one was the British Empire and anti-colonial movements targeted and criticized the British Empire's power over Malaysia. Afterward, in 1957 Malaysia declared independence, thus forming democratic Malaysian political structure and major political parties and political alliances. In declaring independence and establishing a democratic political system, the United Malays National Organization (UMNO) a main political force, retained Sultanate institution, in other words, Kings retained their status (Hamid 2007).

In order to explain title holder status, it is imperative to explain Malaysian Kings. There are 9 Kings from the states of Terengganu, Selangor, Pahang, Perils, Perak, Johor, Kedah, Kelantan, and Negeri Sembilan, who are either named Sultan, Raja or Yang Di Pertuan Besar in English "He who is made great" and once every five years, the Conference of Rulers elect among themselves a federal monarch titled Yang di-Pertuan Agong, in English "He who was made Supreme Lord" (Ali 2013). Yang di-Pertuan Agong is the head of Malaysian state, head of Islamic affairs and commander in chief and holds a vast power over federal government and the army according to the Malaysian constitution. Kings are revered and held in high honor, and they have influence over social affairs. A longtime politician, activist and writer Ali said "the Rulers oftentimes involve themselves in both the political and economic arenas. For example, either directly or through nominees, almost without exception, the Rulers engage in economic activities. This makes them active participants in the process of fostering capitalism. Their traditional leadership positions become strengthened by new economic interests" (Ali 2013).

Malaysian Kings are highly respected individuals holding various types of power in the society. The soft power employs non-coercive maneuver shaping the perception and preferences of individuals' opinions. The soft power contrast from hard power, which relies on direct military force, is founded on cultural and political institutions to influence people (Bell 2016). Kings extend their soft power through granting federal or state honorary titles to the distinguished members of society based on achievements or good deeds. These titleholders are greatly respected in the Malaysian society. Federal titles include Tun, Tan Sri, and Datuk. Furthermore, some of the state titles are named Dato' Sri, Datuk Seri, Dato', and Datuk. A famous Malaysian politician Ali describes the connections between title holders and business interests "These titled persons not only demand to be given respect but also use their ranks and

titles to strike deals with the capitalists and/or compete with the royalties with the purpose of getting more opportunities to accumulate wealth" (Ali 2013).

Malaysia has several political parties and factions. Dato' Sri Najib Razak is the President of the UMNO party; UMNO is the largest of the 13 parties compromising Barisan Nasional or National Front in English. National Front is the leading coalition of parties ruling Malaysia since the declaration of independence in 1957 (Hamid 2007). The main characteristic of the National Front is the achievement that brings together religiously, ethnically and racially divided political parties and fosters a balanced and harmonious Malaysian development. The main opposition to the National Front is the Malaysian Islamic Party in short (PAS), the Democratic Action Party (DAP), and the Parti Keadilan Rakyat (PKR) (Noh 2014). PAS has a strong grassroots support base in Kelantan and Terengganu states where Islamic traditional ideals and ethics are highly regarded. PAS took charge in Terengganu and neighboring Kelantan state during 1990 and 1999. PAS's foremost political goals include establishing an Islamic state, Islamic democracy, hudud a criminal justice system based on Islamic principles, and mainstream Islamic ethical standards to the everyday life of Muslims (Stark 2004).

There are government economic plans that influenced tourism sector development. The beginning of economic development plans started with New Economic Policy (NEP). NEP was created and implemented to industrialize the economy and expand export products, while ensuring equitable distribution of national wealth among the ethnic groups. The equitable distribution of wealth initiative was to improve economic standing of the bumiputra population or ethnic Malays (Torii 1997). The wealth distribution proved to be an unavoidable serious issue when racial riot happened on May 13, 1969. The riot shook the nation's foundation. The NEP was a political response to ease the public sentiment, and table 3.1 illustrates the dates of Malaysian 5 year plans and corresponding economic policy acronyms (Sundaram 1989). NEP was a 20 year policy extending from 1971 to 1990, designed to expand the export oriented economic sectors and raise ethnic Malay people's share of economy (Sundaram 1989). The next national policy is called National Development Policy (NDP), outlined for 10 years from 1991 to 2000. After that a new national economic policy from 2001 to 2020 succeeded, and it is called National Vision Policy (NVP). NVP took a baton from the previous national policies NEP and NDP to advance Malaysian economic and social prospects. The NDP and NVP share NEP's goal to provide 30% share of the economy to ethnic Malays, while ensuring Gross Domestic Product

(GDP) expansion. These objectives indicate Malaysian policy makers' realization of the importance of ethnic groups' interdependence. The table 3.1 shows Malaysian 5 year plans' and corresponding time periods and associated national economic policies.

Table 3.1 – Malaysian development plans

5 year plan	Period	Name
1st Malaysia Plan	1966-1970	
2nd Malaysia Plan	1971-1975	New Economic Policy (NEP)
3rd Malaysia Plan	1976-1980	New Economic Policy (NEP)
4th Malaysia Plan	1981-1985	New Economic Policy (NEP)
5th Malaysia Plan	1986-1990	New Economic Policy (NEP)
6th Malaysia Plan	1991-1995	National Development Policy (NDP)
7th Malaysia Plan	1996-2000	National Development Policy (NDP)
8th Malaysia Plan	2001-2005	National Vision Policy (NVP)
9th Malaysia Plan	2006-2010	National Vision Policy (NVP)
10th Malaysia Plan	2011-2015	National Vision Policy (NVP)
11th Malaysia Plan	2016-2020	National Vision Policy (NVP)

3.1.2 Perhentian Islands

The Perhentian Islands are located approximately 10.8 miles or 20 km from the small port district of Kuala Besut in Terengganu state situated on the east coast of Peninsular Malaysia (Muhibudin and Badaruddin. 2014). The only option to reach the islands is by a mid or small size boat. The Perhentian Islands consist of Perhentian Besar (Large Island), Pulau Perhentian Kecil (Small Island), Rawa, Serenggeh, Susu Dara Besar, and Susu Dara Kecil. Out of these 6 islands, only 2 islands, i.e., Perhentian Besar (large Perhentian), and Pulau Perhentian Kecil (small Perhentian) are inhabited and take around 45 minutes from the mainland jetty at Kuala Besut to reach (Muhibudin and Badaruddin. 2014). The Perhentian archipelago is constituted of islands Kecil and Besar with a total area of 1'392.15 hectares, and several smaller islands (Muhibudin and Badaruddin. 2014).

Figure 3.1 - Perhentian Islands (Islam et al. 2013)

Perhentian Islands have a village on Perhentian Kecil Island. Kampong Pasir Hantu translated as Ghostly Sand Village on Perhentian Kecil has a population of around 2124 as of 2011 statistics (Rasoolimanesh et al. 2016). Perhentian Kecil or small island inhabitants are majority ethnic Malay (Islam et al. 2014b). In Malaysia, there are three large ethnic groups, i.e., Malay, Indian and Chinese. Ethnically Malay people mainly follow Islamic faith, while other ethnic groups such as Chinese and Indians have different belief systems (Noor 2004). The ethnic Malay people are called bumiputra which means "son of the soil" (Hamzah and Hampton. 2013). This term carries with itself an elevated status, because the term bumiputra refers to the common understanding among Malaysians that Malay people came first to Malaysia, and then other ethnic groups followed. However, it's hard to say who came first or last from a researcher's point of view, because current day Peninsular Malaysia was located on a trade route and have been inhabited by people from the Netherlands, Portugal, Yemen, South Asia, Indochina, Southwestern China, Japan, indigenous peoples, Malays, Bugis, Javanese, Sumatrans, Chinese, English, Tamils, Parsees, Gujeratis, Bengalis, and Hadhramis (Gabriel 2015).

One of the leading business sectors in Malaysia is tourism, which received 23.6 million tourists in 2009 (Haddock-Fraser and Hampton. 2012). Overall, tourism industry makes up a notable part of gross domestic product of Malaysia and a driving force behind social and economic development which added USD 21 billion to the Malaysian economy in 2013 (Rasoolimanesh et al. 2016). The pristine natural beauty and marine environment on Perhentian

Islands started to attract tourists from all over the world since the 1980s. During this time period, Malaysia as a country became known to the international travelers and started to become a popular destination for the tourists which eventually led to the tourism sector development. Each areas and provinces in Malaysia advertise unique charms to attract visitors, and for the Perhentian Islands, the main attractions are beach and seashore related activities. The primary tourist activities on the Perhentian Islands include scuba diving and snorkeling to see natural charms such as coral reef (Haddock-Fraser and Hampton 2012).

The Perhentian Islands are located in Terengganu state and out of the 287,149 tourists that visited Terengganu in 2010, 90% went directly to Perhentian and Redang islands, without visiting any other place (Hamzah and Hampton 2013). The number of tourists in Perhentian Islands has been constantly increasing in recent years. Progressively growing number of tourists to Perhentian Islands can be seen from Department of Marine Park's statistics that indicates a 98.7% increase in 10 years, from 123,159 tourists in 2005 to 244,762 tourists visiting in 2015 (Nasir et al. 2017).

To fulfill the satisfaction of continuously increasing visitors, the Kampong Pasir Hantu villagers have been actively moving forward with new developments since the 1980s. In later years mainland Malaysians have started to invest in tourism related businesses on Perhentian Islands to share the economic opportunity provided by the growing tourism sector (Rasoolimanesh et al. 2016). On Perhentian Islands, there are about 45 chalets, 40 souvenir shops, and 19 dive shops (Islam et al. 2014b).

The major infrastructures on the islands consist of jetties, a primary school, a health facility center, a police office, a post office, power generators and a small water treatment plant (Islam et al. 2014b). The islands do not have banks, or automatic teller machines, so all transactions are paid in cash (Hamzah and Hampton 2013). The resorts and chalets on the islands have altogether approximately over 1000 rooms ready to receive tourists (Muhibudin and Mohamed 2014). There are various levels of chalets and resort places including high, medium and low rating depending on interest and budget of the travelers (Hamzah and Hampton 2013). Most of the resorts have unsophisticated interior decoration. Rooms have a bed or two, air conditioner, fan, and attached shower room with toilet (Hamzah and Hampton 2013).

The small island or Perhentian Kecil contains the village Kampong Pasir Hantu where local inhabitants live and Long Beach where mostly medium and high-end resorts are located. Almost all the food is bought from the mainland and carried to the islands, since villagers do not farm anymore. Moreover, the islands do not have enough land to dump the garbage, so trash in entirety have to be carried to the mainland by boat (Hamzah and Hampton 2013).

The Perhentian Islands' Pasir Hantu villagers and mainland Malaysians have strong business relations. Mainland Malaysians visit the islands as tourists and as business partners. Approximately 65% of the chalets and resorts in table 3.2, on the small island are partnerships between Pasir Hantu villagers and mainland Malaysians (Hamzah and Hampton 2013). This type of arrangements, benefits both parties because local villagers provide collateral in the form of land, while outsiders invest capital to build new infrastructures. The business relations and growth slowed down during the rule of the PAN Malaysian Islamic Party (PAS) in Terengganu state from 1999 to 2004. During this period certain types of behavioral norms aligned with cultural standards were encouraged. Moreover, activities such as public topless bathing and excessive alcohol consumption were discouraged (Hamzah and Hampton 2013).

Table 3.2 – Ownership status of mini resorts on Perhentian Kecil (Hamzah and Mark. 2013)

No.	Accommodation	Local	Besut local	Outsider
1.	Rock Garden		✓	
2.	Bubu Long Beach resort			✓
3.	Chempaka chalets	✓		
4.	Lemon grass	✓		
5.	Simfony chalets			✓
6.	Matahari chalets	✓		
7.	Moonlight beach			✓
8.	Panorama chalets	✓		
9.	Lily chalets			✓
10.	Mohsin chalets			✓
11.	D'lagoon			✓
12.	Rajawali coral			✓
13.	Fatimah chalet	✓		
14.	Aur Bay			✓
15.	Butterfly chalet	✓		
16.	Maya beach resort			✓
17.	Senja Bay Resort			✓
18.	Mira Chalet			✓
19.	Petani Beach			✓
20.	Impiani resort			✓

In 1994 the Malaysian government decided to preserve and protect the Perhentian Islands and established a Perhentian Islands Marine Protected Area (MPA). Overall Malaysia has 3'200 km^2 coral reef area and most of it has come under the jurisdiction of MPA. MPA created 2 nautical miles protected area surrounding the islands and declared to preserve the ecological balance and coral reef ecosystem. The establishment of MPA and protection of the pristine marine ecosystem effectively motivated tourism sector to develop on the islands (Islam et al. 2013). The ecosystem surrounding Perhentian Islands contain 221 species of hard coral covering 50% - 70% of the area, 127 species of fish, sea turtles and other life forms (Islam et al. 2014b). The coastal pristine charm combined with exquisite sightings of coral reef and sea turtles protected by the MPA made the islands a famous tourist destination. This research site exemplifies the complex nature of social-ecological system, environmental protection, and habitat destruction connected with economic development, and increasing number of tourists who are adding pressure on the natural carrying capacity (Nasir et al. 2017).

The first Marine Protected Area (MPA) in Malaysia was established in 1983 in the Ministry of Agriculture & Agro-Based Industry's (MOA) Department of Fisheries Malaysia (DoFM) to protect the marine resources. The initiative was directed by the Prime Minister Mahathir Mohamad largely in recognition of the urgency of protecting coral reef habitat zones (Islam et al. 2013). After 21 years of work, in 2004 the Marine Park section was transferred from MOA to Ministry of Natural Resources and Environment (MNRE). In 2006, the MNRE created a special government agency Marine Parks Department Malaysia (MPDM) to manage marine protected areas efficiently. MPDM is a department under the Ministry of Natural Resource and Environment (MNRE) and part of the federal government (Islam et al. 2013).

The establishment of the Marine Protected Area gives rights to manage coastal territory outwards 2 nautical miles from the shore area surrounding the islands. Since 1985 under Fisheries Act and 1974 Environmental Quality Act Marine Parks are declared gazetted territories, forbidding fishing in 2 nautical miles from the shore to preserve the natural habitat (Muhibudin and Badaruddin. 2014). This legislation had a virtuous intention of preserving the habitat but was not effective in taking local population's outlook, whose culture and lifestyle was inseparable from the fishery (Islam et al. 2013).

In 1998 the Marine Parks initiated fee collection and in 1999 all Marine Parks started collecting fees from the tourists to fund the Marine Park activities. The MPA entrance fee structure follows the Fee Act of 1951 and Fee Order 2003. The conservation fees charged at the jetty on mainland prior to boarding a boat to the islands were 5 Malaysian Ringgit (MYR) per adult person, and 2 MYR for children, students and retirees as of 2012 (Yacob et al. 2012). The collected fund is designed to pay for the cost of keeping MPA's pristine condition and natural beauty. The fund is also designed to support recreational usage and sustainable tourism in marine park territory (Yacob et al. 2012). As of September 2017, the MPA entrance fee was raised to 30 MYR per foreign adult visitor, while maintaining 5 MYR fee for a local visitor to enter the Perhentian Islands' Marine Park territory.

There are federal, state, and district level institutions administering and coordinating management activities on the Perhentian Islands marine park. Some of the federal and state agencies have overlapping administration roles (Nasir et al. 2017). The federally managed marine department is in charge of managing jetties, boats, boat licensing. The marine department is in charge of the gazetted area where the fishing is prohibited in no-take zone within 2 nautical miles around the islands. On the other hand, district and state level organizations manage land-based planning and developments (Nasir et al. 2017). The management procedures involve several stakeholders such as federal and state governments, tourism industry, and local villagers. Out of these stakeholders, the local villagers had minimal say in policy and management decision-making processes (Islam et al. 2013). On a state level, Perhentian Islands are under the jurisdiction of Majlis Daerah Besut or in English Besut district council. The district council has several duties including planning and providing cleanliness services across the district. The Besut district and land office coordinates and undertakes operations of land development (Nasir et al. 2017). This office is a crucial decision-making body that is instrumental in the tourism industry in the Perhentian Islands since it grants licenses to build chalets and restaurants.

The researchers have identified the human actions and specifically growing tourism industry ventures and the infrastructure growth to be the main driving factor for the coral reef ecosystem damages (Hawkins et al. 1993). On top of that, the MPA arrangement has restricted fishing in protected area where local stakeholders particularly local population, whose livelihood depended on fishing. This top-down management puts the fishers in a difficult position and

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forces them to change the customary lifestyle which was followed by the previous generations (Islam et al. 2017).

The coral reef has been in danger for some time in areas surrounding Perhentian Islands. Reports have pointed out the number one reason for the coral reef ecosystem destruction is the growing byproducts of unsustainable tourism such as littering, fishing, silt settlement, and pollution (Brackenbury 2002). The tourism development on the two islands with a population of 2'124 has succeeded constructing luxury resorts, chalets, dormitories and camping areas to provide in total 1'124 rooms for tourists. The main tourist areas on the Besar or large island are Pasir Jong, Teluk Keke, and Teluk Dalam. The Kecil or small island has Kampung or village, Teluk Kerma and smaller areas on the eastern coast (Rasoolimanesh et al. 2016). There are 42 chalets and other types of resort locations, and the village acts as a main hub of the settlement, local people work as lodge operators, boatmen, small entrepreneurs and other tourism-related business operators (Muhibudin and Badaruddin. 2014). The Perhentian Islands can be accessed only by boats from Terengganu and Kelantan states. Even to get around on the island from one part to another, the small speed boats are employed. The majority of the tourists spend time tanning, snorkeling, diving, and turtle watching (Yap and Kahoru. 2001). To prevent from the developmental negative impacts, the tourism-related development and activities need a closer look to ascertain the environment related questions such as water safety and construction of tourism facilities (Mohamad et al. 2015).

The ongoing rapid social-ecological change in the Perhentian Island has been aggregated by the uncoordinated management mechanism dealing with the MPA and tourism sector's influence on the local population and ecosystem. The problems of communication, coordination, overlapping roles, and policy synchronicity in the levels of government have to be cleared (Islam et al. 2013). The MPA and other related regulations have to address the tourism sector to make it more sustainable in the long run. Most importantly, management mechanism should be improved so that the native people of the islands will not go through hardship in order to sustain economic development.

3.2 Research Design

This research focuses on Perhentian Islands in Malaysia and investigates the social-ecological interconnectedness on multiple levels to understand ongoing social-ecological rapid changes and their impacts. This research followed a deductive approach. Deductive approach constructs a hypothesis out of existing theory and known knowledge then places it under empirical inquiry (Bryman 2012). The drawn-out hypothesis has to be translated into operational researchable objectives and data collection steps (Bryman 2012). To answer objectives of this thesis, the research follows a mixed method approach. Out of various mixed methods, a two-phased sequential explanatory approach was used. A sequential explanatory mixed method approach is characterized by the data collection order, first quantitative and second qualitative. In the explanatory mixed method, the second phase, qualitative data is used to interpret and explain the first phase, a quantitative data (Creswell 2014). This research approach is useful in explaining and revealing in-depth research problems represented in the gathered quantitative data by inquiring qualitative information in the second phase (Hesse-Biber et al. 2015). The qualitative second phase can concentrate on both conventional and/or outlier cases found in the initial quantitative phase for the further analyses (Domínguez and Hollstein. 2014).

This research strives to find answers to the established goal and objectives using sequential explanatory mixed method approach comprised of the Likert survey and the focus group. The determined research goal is to examine key attributes of rapid social-ecological change in the coastal-marine systems in Perhentian Islands and understand their implications for governance. Furthermore, this research has three objectives (see Chapter 1). First objective is to identify and characterize the nature of rapid social-ecological change taking place in the study site and the driving factors influencing it. Second objective is to understand various power dynamics that contribute to and result from of rapid social-ecological change through power cube framework and to recognize and analyze the equity concerns inherent in the ongoing rapid social-ecological change. Third objective is to examine governance implications on ongoing social-ecological rapid change and suggest ways to improve it by applying adaptive co-management as a governance component.

The Likert survey was used in the quantitative phase of this research to examine key attributes of rapid social-ecological change and understand their implications for governance. The Likert survey was instrumental to understand ongoing rapid change and its specific attributes, because it is a quantitative research tool that is capable of capturing people's opinions,

values and attitudes regarding the object being studied (Likert 1932). Ongoing rapid change on Perhentian Islands is a transformation process encompassing both social-ecological dimensions. Even though collecting data that depicts such a widespread multi-dimensional factor poses a difficulty, Likert survey tool was a right fit for this challenging task because it was capable of collecting and appointing numerical values to the collected data that represents people's opinions.

Following the quantitative first stage's survey data analysis regarding main factors of rapid social-ecological change, the second stage focus group discussions were held with the key stakeholders. Focus group was useful to research in-depth opinions, values and attitudes that are pointed out in the initial survey phase. Rapid social-ecological change is a phenomenon covering large area of topics, so a research tool such as focus group fits the qualification, because it allows 6-10 participants to discuss the questions being asked from multiple angles and provide relatively objective response. The focus group helps to reveal study participants' point of view and perspectives (Bryman and Edward. 2016). The group discussions were useful in probing nuances and explain those rapid change details. The focus group discussion with three groups of stakeholders examined specific attributes and aspects of the each objective.

In this two phased sequential explanatory mixed method research Likert survey and focus group discussions were used, successively. The data collection captured major stakeholders' opinions and beliefs regarding rapid social-ecological change to understand causative factors and what can be done about it. The questionnaire design and specific questions were finalized after visiting the Perhentian Islands and grasping the local issues from close distance. Moreover, establishing contact with villagers and learning about the local culture was important for starting a successful professional relationship. The initial local contacts became the base of actualizing snowball sampling and to build connections with the villagers. The snowball sampling is a non-probability convenience sample that makes contact with individuals who establish other group of persons who are relevant to the research (Bryman 2012).

3.3 Research Methods

3.3.1 Survey

It is difficult to quantify or assess subjective human attitude and behavior. Nevertheless, collecting research data for the research purpose is necessary and a suitable data collection tool is required (Likert 1932). For the research determining and assessing human attitude, personality, and belief on a topic is a challenging venture. One of the challenges is to convert human perspective regarding a topic and theme into a numerical value (Joshi et al. 2015). Regardless of the difficulty, researchers of social science have been using quantitative tools to determine attitudes conveyed by the individuals (Boone and Boone 2012). Out of many quantitative tools, the Likert survey has been popular in questionnaire data collection to measure attitudes of the target group (Weng and Cheng 2000). The Likert survey has become well known tool because it has "strongly agree" to "strongly disagree" scale that can be employed in various environments and situations. Moreover, the survey is straightforward and easy in the eyes for the respondents (Revilla et al. 2013). Likert survey data collection is well known among social scientists conducting surveys to measure attitude. A survey is made up of questions and statements that are designed for the participants to answer, for the purpose of measuring attitude (Dittrich et al. 2007). The conventional Likert survey has five categories of answers. In other words, the five point Likert survey's answers range from "strongly disagree" to "strongly agree". The number of answers are not strictly structured, thus there are Likert survey with seven answers (Jamieson 2004). Theoretically, it could have more than seven answers, if the researchers deem it necessary. For analysis, the participants' answers are scored, then added together to measure the intensity of the attitude regarding the research topic (Bryman 2012). For the internal reliability of the Likert survey, the Cronbach's Alpha has been used (Subedi 2016). For the sequential explanatory mixed method approach, the qualitative second phase assists in explaining and exploring the issues found in the first phase responses by asking in-depth questions. Furthermore, the two phased mixed method approach that combines quantitative and qualitative methods complements each other by qualitative data enriching quantitative data.

Prior to conducting the survey, the Kampong Pasir Hantu village population's opinions and thoughts on the research questions were examined to ensure the potential participants were comfortable with the questions. The research questions sought to understand participants' perceptions of social-ecological change taking place in Perhentian Islands, threshold, power dynamics and other relevant topics that would be used to answer research goal and objectives.

The use of perception in research is defined by Bennett as subjective interpretation of reality "I propose the following definition: perceptions refers to the way an individual observes, understands, interprets, and evaluates a referent object, action, experience, individual, policy, or outcome. Observations are based on sensory experiences, including sight, hearing, smell, touch, and taste. These individual and subjective interpretations of reality are socially constructed, the product of one's history and surroundings" (Bennett. 2018). Using perception in research provides advantages such acquiring data from participants who have firsthand experiences of events and objects being studied. On the other hand the collected data could be participants' subjective interpretations of reality and it can change over time "As a result, like and unlike groups and individuals can perceive the same situation in vastly different ways. Perceptions can also change over time" (Bennett. 2018). There exist several types of sampling methods namely simple random, systemic, stratified random, multi-stage cluster, convenience, and quota. These sampling methods each have positive and negative attributes and can be employed in different circumstances (Bryman and Edward. 2016). Having a larger sample size provides a greater representativeness and randomness (Bryman. 2005). The sampling units can be based on the geography, social status or construction units. These criteria should be carefully analyzed and formulated, due to the high chance of overlapping (Kothari. 2004). In this research snowball sampling was employed to undertake Likert survey and focus group. The non-probability, snowball sampling relies on the initial small number of relevant people who assist in making contacts with larger groups of research participants (Bryman and Edward. 2016). Snowball sampling was used in order to build a trustworthy relationship with the Perhentian Islands village people. It was crucial to gain acceptance and openness from the local people. In order to be accepted in the village, the village elders were contacted first. Then the elders and village chief granted permission to conduct the survey and focus group on the Perhentian Islands. After receiving permission, the village chief assisted in locating research participants. All 25 survey participants were Perhentian Islands' village people. Out of 25 participants 28% were women and 72% men. There was no intention to include more men, and participants' weren't chosen for their gender. In the second phase of the research there were more women than men. The participants were chosen using snowball sampling. The focus group participants' were chosen with the help of survey participants. There was no preference on gender, so respondents were fisher, business people, boat drivers, company employees, etc. During analysis of the research

data, the participants' identities were secured, by using code numbers instead of names. The survey participants' primary occupations are listed in figure 3.2.
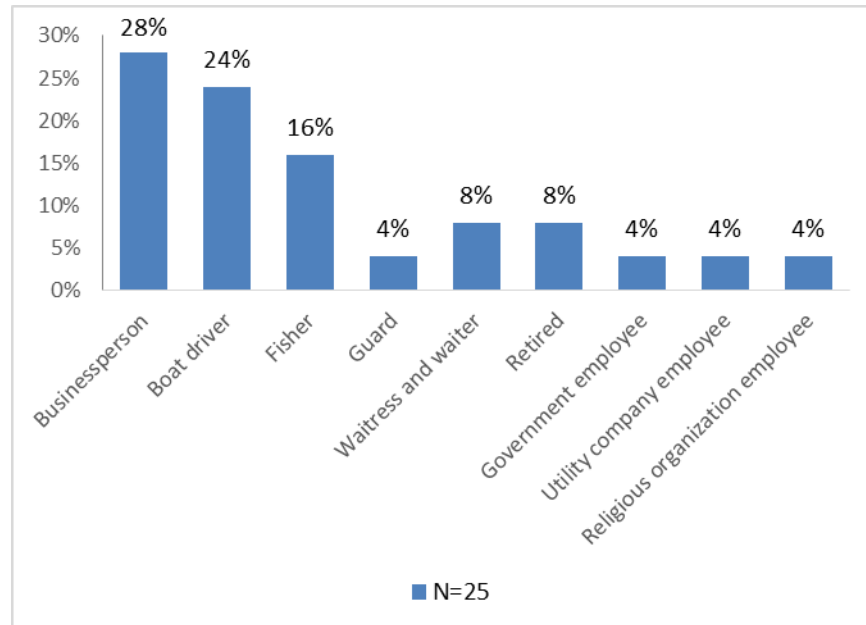
Figure 3.2 – Survey participants' primary occupations

The first phase of this research employed a five-point Likert survey. This was a quantitative part of the sequential explanatory mixed method approach. The first phase of this research was to gain initial quantitative measurements of the social-ecological processes, stakeholders, power dynamics, equity, governance and management concerns of ongoing social-ecological rapid change. The quantitative data collection had 33 items survey questionnaire and fill in boxes to write in driving factors of rapid social-ecological change and island business owners' general characteristics as believed by the participants. Moreover, the two questions 12 and 15 had fill in boxes. The survey is in the appendix B. Altogether the survey had 35 questions. The questionnaire had 4 subsections namely, "rapid social and ecological change", "power dynamics", "equity" and "governance and management". 5 point Likert survey ranged between 5 "strongly agree", 4 "agree", 3 "neither agree nor disagree", 2 "disagree" and 1 "strongly disagree". Each survey lasted from 30 to 60 minutes, depending on the clarification and individuals being questioned. Summary scores of each question were calculated and

converted into percentages. Then, relevant subgroup responses were analyzed in cluster. The mode and median of the questions were calculated to figure out attitude tendency. Likert survey measures attitude and behavior. Attitudes can be a positive or negative feeling and belief towards a particular object or event (Bryman. 2005). In the qualitative second phase of the research, the survey responses were retouched in order to explore in-depth issues and discern the intricacies of the data to answer the research objectives.

3.3.2 Focus Group

The purpose of the second phase of the sequential explanatory mixed method approach is to use qualitative results to assist in explaining and interpreting the findings of a quantitative phase (Bryman 2012). In the second phase of the research, focus group discussions were held to capture participants' as well as the groups' opinions and attitudes on the research objectives. In order to capture various opinions guiding questions were asked from the groups and discussion between participants were encouraged. In general, focus group method is used in the qualitative approach where a group of respondents are interviewed and encouraged to discuss the issues at the same time (Kothari. 2004). The facilitator of the focus group guides the discussion, providing respondents maximum opportunity to speak up and share ideas, views and the reasoning behind particular views. The dialogue between focus group participants have a chance to encourage, share and challenge each other's opinions, then produce agreement or produce realistic perspectives of the objects discussed (Bryman and Edward. 2016). Ideally, conducting focus groups from demographically diverse respondents would be more inclusive. The size of the group can be from 6 to 10 members to collect sufficiently varied perspectives on the research topics (Bryman and Edward. 2016).

The focus group discussion in the second phase aimed to grasp and understand deeply the local stakeholders' opinions and beliefs on power dynamics, equity, governance and management issues related to ongoing rapid social-ecological change that are identified in the quantitative phase of the research. To understand issues in-depth, focus group discussion topics were set and the questions were prepared beforehand with a room to navigate during the dialogue. The guiding questions were formulated and listed to cover major areas of interests and issues under question such as social-ecological change, threshold and other major research

topics. The questions were formulated in order to allow participants to provide their perceptions and opinions. In research perceptions of participants can be collected using several different ways including qualitative and quantitative methods "To study perceptions, qualitative, participatory, and quantitative methods can be used" (Bennett. 2018). The research data that is based on participants' perception can show individual and/or collective subjective interpretation of reality "A myriad of contextual factors (e.g., culture, politics, socioeconomics, livelihoods), past experiences of similar events (e.g., imposition of a different environmental policy), and individual and collective attributes (e.g., gender, race), values, norms, beliefs, preferences, knowledge, and motivations mediate and influence perceptions" (Bennett. 2018).

Ordering of the questions was flexible and allowed the participants to speak up, provide possibility to contribute new arguments and details regarding the research questions. The focus group discussion's guiding questions are included in the appendix C section.

The types of questions used in focus group are similar to an oral interview. For example, introducing, follow-up, and open-ended questions pertaining to specific issues can be asked during the focus group to grasp values, and beliefs of respondents. The difference between interview and focus group is that in focus group the moderator has to manage the discussion and try to involve all the respondents (Bryman and Edward. 2016).

Furthermore, the second phase was to clarify complexities and deepen the understanding of findings from the previous phase by conducting three focus group discussions. The three focus group discussions were held with the representatives from the fishers and boaters, business people, and local women. The individual participants were identified during first phase of the research and asked to join the second phase, at the end of survey. Moreover, new participants were identified with the help of survey participants using the snowball sampling method. Snowball sampling relies on the initial contacts to locate additional respondents to partake in the research (Bryman and Edward. 2016). Focus groups discussions had 7 to 9 participants. Out of total 23 focus group participants 70% were women and 30% men. This division was not intentional and there was not any explicit gender preference.

The focus group had 29 questions divided into 6 subsections namely to address three research objectives. The "time periods" subsection aimed to understand how the tourism sector developed during decades since 1980. The subsections "social changes" and "ecological

changes" aimed to understand what are major changes occurring on the Perhentian Islands. The subsections "power dynamics" and "equity" addressed what type of power dynamics are active on the islands and how equity concerns are affected. The "governance and management" subsection tackled with current management issues and what can be done about existing shortcomings. During the discussion sessions audio was recorded with the permission of all the participants. Then a Malaysian translator has transcribed the focus group audio recording. The translator had signed a confidentiality agreement prior to joining the research project, promising not to reveal talking points and identities of the participants. After conducting the focus group, the participants' names were coded to guard individuals' identities. These coded numbers were used when quoting individual participants' responses. At last, the ethics clearance form of this research is included in appendix A.

3.3.3 Data Analysis

The data collected using two phased sequential explanatory approach was directed at answering three research objectives. In order to analyze the data, consecutive steps were taken. The collected data in each phase had to be aligned with the research objectives and then corresponding points in two phases were arranged and combined.

Firstly, the Likert survey questionnaire in the first phase of the research had 4 subsections "rapid social-ecological change", "power dynamics", "equity", and "governance and management". The subsection "rapid social-ecological change" addressed the first objective of the research. The subsections "power dynamics" and "equity" aimed to answer the second objective. The subsection "governance and management" addressed the third objective. There were 33 survey questions with 5 potential response choices. Following the end of the first phase of the research, collected survey data was typed into Microsoft Excel. An Excel datasheet was created to arrange the collected Likert survey data. The datasheet was instrumental in sorting, ordering, and numbering the responses. The row cells on Excel were labeled according to the survey question numbers from 1 to 33. The column cells were labeled corresponding to the respondents' numbers, adding up to 25. The cells located at the crossing of a column and a row were filled with 5 different Likert survey responses ranging between "strongly agree", "agree", "neither agree nor disagree", "disagree", and "strongly disagree".

After, all the cells were filled; Excel functions were used to determine which questions received how many answers from the 5 different Likert survey responses. Then the survey responses to the questions were converted to percentage adding up to 100%, so that those percentiles could be used in the results chapter. For the purpose of making the data visually unambiguous and comprehensible the graphs pertaining to the responses were made on Excel. Some of the graphs were produced on Microsoft PowerPoint and Word using data calculated on Excel, due to better design capability. Similarly, mode and median of 33 responses were calculated and arranged using Excel functions. For question number 12, "What are the main factors influencing the change?" participants' responses were collected and typed into the Excel datasheet. Then, the responses were counted, converted to percentile, and presented graphically in chart form. For this question, the participants picked responses out of six different choices "tourism activities", "fishing", "outside fishers", "trawl fishing", "land-based construction", "artificial reefs" and additional "other". The 7th choice "other" was available if participants wanted to add extra driving factors leading to the change. Although participants were encouraged to add other factors if they thought necessary, there were no extra factors added. For the question number 15, "Who are the main owners of the businesses?" which was designed to find out the information regarding business owners according to the Kampong residents, the participants wrote in business owners' ethnic backgrounds. Those responses were collected and typed into Excel datasheet. The first column was labeled to arrange participants' numbers and the second column to add responses. Then the responses were counted and converted to percentiles to prepare a graph. The responses ranged between "Malays", "Locals", "Outside Malays", "Chinese", and "Chinese and Outside Malays".

After quantitative data input and analyses, the qualitative data analysis phase began. The focus group had 29 questions divided into 6 subsections "time periods", "social changes", "ecological changes", "power dynamics", "equity", and "governance and management". The purpose of the qualitative focus group discussions with the representatives of three groups such as fishers and boaters, business people, and local women were to supplement and understand the data collected during the first phase. The focus groups discussion transcript was translated to English by the translator in Microsoft Word, then analyzed and evaluated. In the results and discussion chapters, the participants' responses were mentioned either to support quantitative data or provide insight to the issues being discussed. The "time periods" section had 4 periods

from 1980 to 2017 and asked how the tourism sector developed during those decades. These analyses allowed grasping chronological progress of the island development and realize corresponding characteristics to each decade. The "social changes" and "ecological changes" subsections addressed the first objective of the research. The "power dynamics" and "equity" subsections addressed the second objective. The "governance and management" subsection was to encourage participants to discuss and answer existing management mechanism and what can be done to make it better, which corresponds to the third objective.

3.4 Limitations

The limitations of this study is scale specific, in other words it is focused on rapid social-ecological change in Perhentian Islands, thus not directly associated with other research sites. The findings of this research could be difficult to generalize, due to the multiple factors affecting unique and site specific rapid social-ecological change. This research involves various factors driving rapid change from national, regional and local levels, thus creating a distinctive condition. This research was done during one month period from the end of August to end of September in 2017. During this time period, I stayed in Kuala Lumpur, the capital of Malaysia and made two trips to the Perhentian Islands. Each trip lasted around a week. Therefore, there was not sufficient time to travel to the neighboring nations or provinces within Malaysia and conduct other social-ecological rapid change in-depth researches. Another possible limitation of this research could be related to participant sample, who are 100% Perhentian Islands' villagers. The survey and focus group discussions were conducted with only Kampong Pasir Hantu villagers, in order to grasp their point of view regarding ongoing rapid social-ecological change.

Although, all participants were from the Kampong Pasir Hantu, they represented various social groups such as women, men, chalet manager, boater, fisher, government employee, religious organization employee, village chief, etc. The participants' diverse background allowed inclusion of opinions representing different groups and individuals. In some instances these opinions were conflicting with each other. Another possible limitation is the use of power cube framework. The power dynamics study in this research uses power cube framework, henceforth analyzing power dynamics within the framework boundary. Analyzing power dynamics within a

framework gives an opportunity to study power dynamics systematically. Using a single power framework to analyze power dynamics could have both advantage and disadvantage. The advantage is that it's more systematic and straightforward. The disadvantage of using a single theoretical framework depends on the theory and it might lack some elements that other frameworks possess. All things considered, the researcher's personal subjectivity has a possibility of influencing the qualitative data analysis. Nonetheless, the sequential explanatory mixed method approach's quantitative data analysis lessens the potential personal bias (Ivankova et al. 2006). In other words, the use of two phased mixed method approach diminishes potential subjectivity of the researcher.

CHAPTER 4

Results

4.1 Introduction

This chapter aims to present the results of the field research, organized to answer each objective (see Chapter 1). The first objective of the research is to identify rapid change taking place in the Perhentian Islands and identify the key driving factors causing the change. Rapid change includes both social-ecological changes. The result findings indicate that the tourism sector growth is a main driving factor causing social-ecological rapid change in Perhentian Islands. The tourism development started in the 1980s, and intensified in each following decade. This case is identified as a rapid change because during this timeframe Perhentian Islands' environment and the villagers' life style that remained the same for hundreds of years have transformed. The attributes indicating social-ecological changes are analyzed separately in detail, in order to make the results chapter organized. The second objective is to understand various power dynamics that contribute to and result from of rapid social-ecological change through power cube framework and to recognize and analyze the equity concerns inherent in the ongoing rapid social-ecological change. The power dynamics factors are analyzed and divided into separate groups by employing power cube framework. The Power cube framework provides the opportunity to dissect the power dynamics by associating social relations in visual representations such as tables, and figures and making them effortlessly comprehendible. On top of that, objective two aims to find out the reasons behind equity issues by analyzing power dynamics.

The third objective is to examine governance implications on ongoing social-ecological rapid change and suggest ways to improve it by applying adaptive co-management as a governance component. In this case adaptive co-management is chosen because the management mechanism suitable for rapid social-ecological change should take into account social dynamics resulting from the rapid change. To illustrate a potential management mechanism that can be a component of governance, MPA management is used as a focal point to address social-ecological rapid change and power dynamics issues. The third objective attempts to find out

Perhentian Islands' villagers opinions to improve the existing management mechanism by using MPA management as a focal point because the villagers have sufficient understanding about how MPA operates and can provide potential ideas to remedy the issues at hand.

4.2 Existing Social-Ecological Rapid Change

4.2.1 Factors Influencing the Rapid Change

The social-ecological rapid changes occurring in the Perhentian Islands have several main driving forces and some are weightier than others in magnitude. The type of factors influencing rapid change and their proportions are presented by percentiles in figure 4.1. In this figure, focus group members identified tourism related activities as the primary driving factors of the changes. The tourism sector's development in Perhentian Islands has started since the 1980s. Moreover, the rate of change has been increasing decade by decade. The rate of change has been highest in the last 2 to 3 years as participant 148 said "Many of the new chalets and buildings are constructed in the last 3 years". This increasing rate of change can be an evidence of a rapid change. The tourism sector attracts and incites the local villagers to change their life style from being a fisher to either an employee or business owner within the tourism sector. The younger generation of villagers mainly leans towards the tourism sector as their top preference. Participant 147 noted "Children want to have the job that brings most income; they think it's easier to get income from the tourism than fishing. Children are not following the footsteps of the parents. If a parent works in tourism then children will follow the parent's footsteps, but if a parent is a fisher then children won't follow parent to become a fisher. If a parent is in tourism sector, for example, a boat driver, children will buy a boat so that they can enlarge the family business".

The focus group participants discussed and pointed out primary and secondary driving factors by percentage. In the primary driving factors, out of 100% a total of 80% was designated to the tourism activities, in figure 4.1. To add extra substance and depth, the secondary driving factors were discussed and out of several factors land-based construction came on top with 43%, in figure 4.1. On the question about the prospects of land-based development, participant 129

said "It will increase in the future. Until now most developments were funded by the locals. Now, outside investments are increasing because outsiders see opportunities here. Most importantly, the number of tourists visiting here fosters and dictates the change of development". The land-based constructions act as the physical driving force leading to most of the changes because it alters the physical make-up of the environment. Therefore, tourism related activities can be considered as social driving factors and construction related activities as physical or ecological driving factors. However, both activities are primarily driven by economic development policies whereby business people value monetary gains higher than social-ecological values. The economic policies are established and driven by the federal level administration and enforced by government organizations at the local level. The business people are local villagers, Terengganu state residents, investors from Kuala Lumpur and foreign nations. As Perhentian Islands' reputation as a tourist destination grows, investors from mainland Malaysia seek to build new constructions on the islands. This trend has been recognized by the local villagers and has become a cause of distress. The villagers feel threatened by the large corporate encroachment into the village economy.
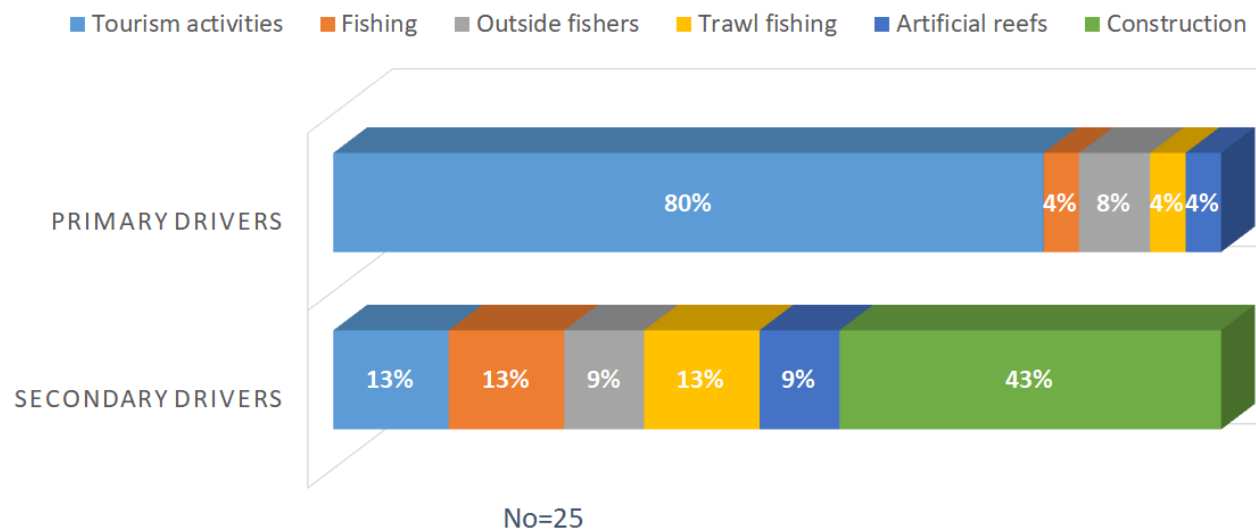
Figure 4.1 – Main factors influencing the change

Tourism is the main source of income, and thus holds a powerful influence over social life in the Perhentian Islands. Furthermore, the incentive to earn income in this business sector

influences business owners to disregard environmental concerns. For example, construction activities on the shoreline in figure 4.2 reduce the beach area and natural beauty of the islands. However, current business practices on the islands pay little attention to the ecological and social concerns. The Figures 4.2 shows commercial buildings constructed on the edge of the beach area to maximize the business operational space.

Figure 4.2 – Buildings on shore

4.2.2 Rapid Social Changes

To analyze the ongoing rapid change in the Perhentian Islands, the major changes are divided into two parts. The social-ecological outcomes of the rapid change are grouped separately for review. In this section the aspects that characterize social changes resulting from rapid change are identified. Some aspects of the societal changes can be seen from the answers to the questions addressing income, education and health facilities changes. The answers obtained from the survey address changes in women's employment, school enrollment, health care facilities, and income. These issues were selected and included in the survey based on observational analysis during a preliminary visit to Perhentian Islands. During the preliminary visit to the islands, villagers' lifestyle was observed and these issues were highlighted because these were the noticeable changes that happened in the last few years according to villagers.

To understand demographic variables representing social-ecological change in Perhentian Islands several questions were asked. Change in women's employment is a demographic variable that portrays ongoing social change in Perhentian Islands. To the question on whether there is increase in women's employment status from the survey participants, responses were 56% "strongly agree" and 28% "agree". In total, 84% of the participants agreed there is an increase in women's employment in table 4.1. The remaining 16% are divided into 8% "neither agree nor disagree" and 8% "strongly disagree" as shown in table 4.1. These participants were mostly men and I believe had limited knowledge on the women's employment status. In the traditional fishing village in Perhentian Islands, the labor division was based on gender. Men used to sail and fish and transport goods, while women attended household duties and raised children. This type of work arrangement is rapidly changing. Now most of the women are earning wage and working outside of home. One of the primary traditional duties for women was to raise children at home. Nowadays, several factors are changing this trend; women are engaged in work and have financial means to send children to school. Participant 142 said "More people are sending their children to school as the development improved the income, people now understand education is important. Parents understand the children cannot become owners of the businesses without obtaining knowledge". In response, participant 145 provided an insight about the young generations' preference to work instead of taking classes "After finishing middle school, children are eager to have job and income, so they drop out from the school and start working". Change in school enrollment can be a demographic variable exemplifying social change. To the question, whether there is increase in school enrollment, the tables 4.1 presents the following data. The participants answered 36% "strongly agree", 56% "agree" and 8% "neither agree nor disagree" accordingly and by adding up 36% and 56%, totaled 92% which is a percentage of participants agreeing to increase in school enrollment in table 4.1.

With the overall construction development, the health care facility has improved on the islands. Previously, the fishing village had no modern medical facility. Now there is no large hospital but there is a medical facility operating in the village to mend minor injuries and sell medicines. This development represents change in institutional variable. The respondents answered, to the question if there is an increase in health care facilities on the islands, 24% "strongly agree", and 64% "agree". Out of 100%, 88% agreed to the positive change in available medical facilities, in table 4.1. On the same note, the quality, number of doctors and personnel of

the operating facility are still limited. This fact indicates that health care facilities should improve to accommodate the villagers and tourists' needs. The health care facility is one story house with a waiting and a treatment room. The figure 4.3 shows island police station on left and medical center on right.

Figure 4.3 – Perhentian Islands' police station and health facility

Previously the economy of the village largely depended on traditional fishing and household level farming. Now fishing is banned in 2 nautical miles from the shore by MPA and villagers have become wage earners. This event represents change in institutional variable on Perhentian Islands. However, there is still some fishing activity going on, which is illegal according to MPA rule. The table 4.1 reveals social and economic changes in four categories. The four categories are income change, school enrollment change, health care facilities availability and women's employment. Villagers' lifestyle has changed over the years, and participant 133 said "Until 1990s almost all men were fisher, over 95% jobs on the islands were farming and fishing". The traditional type of job mostly consisted of fishing and minimal degree of potato and other vegetables farming to meet household demand. Moreover, participant 133 added "in 1990s islands started to open for tourism, and until 2000 villagers were not entirely focused on tourism and there were still traditional fishermen". The same participants also said "until 2000 approximately 45% of the population was focused on the tourism sector, and job opportunities for the inhabitants started to increase". This participant's response points out the

start of the employment change in the 1990s from fishing and farming to tourism related jobs. This participant's response indicates the tourism industry's role in growing level of job opportunity. To the questions if there is increase in income which represents change in demographic variable, the participants answered 56% "strongly agree", 28% "agree" and in total 84% answered income has risen, in table 4.1. This indicated there is a rising income change.

In Perhentian Islands' context boat taxi and other boat related jobs are 100% managed by men due to their boating skills, cultural practices and labor distribution standards. In the traditional fishing village women primarily did the household duty, but now the village women essentially work in shops, cafes, school, offices and chalets. Participants 141 said "in 2000s around 65% of the population was focused on tourism sector, and women were not working in tourism sector" and later added "from 2010, almost 100% of the islanders work in the tourism sector, and village women also started working in the tourism sector". While discussing changing job opportunities on the islands, participants voiced various opinions on how the tourism industry and job opportunities are linked. Participant 130 expressed own insight "On average 500'000 tourists visit the islands each year. The job availability increased at highest rate from 2010, and the job opportunity is completely dependent on the tourism sector. Thus the more tourists visiting the islands translate to more job opportunity. Construction work equals more jobs, so we favor development. During this period, most of the development occurred and created job opportunities". In general participants agreed to the rising income level even though there are still discrepancies between business owners and workers among the villagers, whose financial benefit and satisfaction differ. Likewise, while majority of the participants agreed to the rising income, they also voiced dissatisfaction with the fishing ban imposed by the MPA. Formerly, fishing was free and it was undertaken for the sustenance. Currently, villagers buy fish from the mainland markets. This is a major cause of dissatisfaction among the villagers. Participants wanted to keep the tourism-related income but also wanted to go catch and sell fish in the mainland market. Overall, villagers want to have diversified income streams.

Table 4.1 – Social-ecological rapid changes

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Income increase	56%	28%	8%	0%	8%
Health care facilities increase	24%	64%	4%	8%	0%
Increase in school enrolment	36%	56%	8%	0%	0%
Increase in women's employment	60%	36%	0%	4%	0%
Decrease in coral reef health	12%	56%	0%	32%	0%
Decrease in fish stock	12%	48%	0%	28%	12%
Decrease in turtle population	12%	64%	8%	16%	0%
Decrease in beach cleanliness	28%	64%	0%	8%	0%
Decrease in water quality	16%	36%	16%	16%	16%
N=25					

Villagers' contact with mainland has widened following the developmental activities associated with the tourism. Previously fishers used to live on the islands all year round, now many of them have residences in the mainland Kuala Besut district in Terengganu. During the Monsoon season, when tourism ceases, only fishers and care takers of the tourism related establishments remain on the islands and all other residents leave to the Kuala Besut district on mainland. The tourism has provided opportunity to befriend and to know a large number of visitors working in the tourism sector. Therefore, now villagers have more contacts and friends on the mainland and abroad respectively. This is an example of change in demographic variable which shows increase in villagers' contacts on mainland Malaysia. Participant 144 said "the tourism sector allowed us to meet with mainland people and become friends. When they return again next time to the islands, we help with accommodation." Participant 145 added "since our income increased, we have more friends and relatives on the mainland and people buying land in

the mainland with the extra income". Table 4.2 lists different types of contacts between island and mainland Malaysians.

Table 4.2 – Island and mainland Malaysians contacts

Types of Contacts	Significance
Friends on mainland	Establish bonding friendship with the tourists.
Food suppliers	Villagers, cafes and restaurants need constant supply of food.
Construction material suppliers	Tourism industry's expansion encourages land based construction development.
Village Chief's contacts with government officials	Village Chief's duty includes managing land contracts and business licenses on behalf of villagers.
Contacts related to purchasing properties on mainland	Villagers purchase properties on mainland with the income generated from tourism related activities.
N=25	

Tourism infrastructure development maintenance requires the constant restocking of material, food and other products and supplying services to fulfill the demands. The villagers' have established contacts with business providers on the mainland to meet those necessities. Participant 131 said "With development, the number of friends in the mainland increased. To keep the development, people needed more supply of construction materials, and resources. So they built up more contacts and befriended mainlanders". The islands don't produce food products, and most importantly fishing around the islands is banned. On food availability and quality, participant 147 responded "Income is increasing and daily food intake has also increased and since the 2000s people could afford to buy chicken which comes from the mainland". Furthermore, the same participants told the fish quality has been lowered from the time when fishers were allowed to catch their own fish "The quality of food is decreasing because fish and vegetables are coming from mainland market. Before tourism intensified we used to eat fresh fish". Although fishing is prohibited, illegal fishing exists and it is perpetuated by both outsiders and villagers. Outside fishers use expensive high-end equipment namely trawl fishing. On the other hand, villagers fish traditionally, during night time for the purpose of subsistence.

A traditional village in Malaysia has a village chief, pengulu. Each village has a different way of selecting the pengulu. For the Perhentian Islands' village, the pengulu or chief is elected once in 6 years, and allowed to rerun in the next election. Village chief holds vast amount of prestige and distinction among the villagers. The chief's words and decisions are respected and followed by the whole village. Villagers discuss new development projects and ongoing business deals with the chief and chief consults and support the projects in various ways. One of the chief's roles is to consult villagers on the procedures to obtain licenses and permits that are needed to do business or build houses on the islands. These permits are obtained from the state and district government offices.

The Perhentian Islands' villagers' are involved in the tourism related development activities. Local villagers' participation in development activities are analyzed in table 4.3. It shows the degree of participation in development activities and change in demographic variable because these development activities allow villagers to benefit from the tourism sector growth. The question on villagers' involvement in the tourism sector received answers 96% in agreement, adding up both "strongly agree" 80% and "agree" 16% options in table 4.3. For the question on villagers' involvement in business activities on the islands, 76% of respondents answered "strongly agree" and 20% "agree" in table 4.3. These responses indicate local people are involved in the development activities. However, not all involved parties in the development process have the same capacity, thus 4% of respondents did not participate in business activities, and 4% did not involve in tourism activities, in table 4.3.

Table 4.3 – Villagers' activities

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Villagers' participation in tourism sector	80%	16%	4%	0%	0%
Villagers' participation in business activities	76%	20%	0%	4%	0%
Villagers' fishing activity in non-rainy season	52%	24%	0%	4%	20%
Villagers' fishing activity in rainy season	84%	16%	0%	0%	0%
N=25					

Local people reported that the income from development and tourism activities have not been able to fulfill all the needs and this could be the reason for which many villagers are still fishing illegally. Villagers were asked on seasonal fishing patterns and 100% of the respondents agreed to the fact that fishing occurs even today during the monsoon season, in table 4.3. During the monsoon, tourism activities halt completely, and the only available source of income is fishing. Furthermore, people understand that tourism activities alone cannot provide year-round income and other sources of income must be introduced.

To the question addressing if there is a fishing activity during non-rainy season, 76% of respondents agreed and 24% disagreed in table 4.3. During the non-rainy season, tourism related job and business opportunities to earn income reduce the incentive to fish. Thus, a lower number of people are involved in fishing during this period. Nevertheless, 76% of people agreed that some form of fishing still happen during the non-monsoon season in table 4.3. MPA rules forbid fishing within two nautical miles around the islands, but these areas have remained important fishing grounds for the villagers. Moreover, traditional fishing tools and methods are not appropriate for fishing outside the 2 nautical miles into open waters. Most fishers do not agree with the MPA rule that forbids fishing because villagers' catch size (small quantity of catch, solely for the purpose of household consumption) does not pose a huge threat to the overall fish population. The type of fishing that is posing threat to the fish population is the trawl fishing. Trawl fishers use large and expansive boats to catch fish in large scale.

4.2.3 Rapid Ecological Changes

The ecological condition in Perhentian Islands is changing since the 1980s. The rate of change intensified from 2010 with the tourism sector's growth. Visible changes to the island ecology are apparent even by simple observation. Table 4.1 identifies major ecological changes happening on the islands. To understand specific ecological changes happening around and on the islands, the related attributes were examined. The rapid change concerns regarding native species focused on decrease in coral reef health, fish stock and turtle population. The questions addressing ecological rapid change focused on decrease in beach cleanliness and water quality.

The beach areas around the islands have been overly utilized and this resulted in lowered cleanliness. The beach view has been deteriorated and this change can be seen in figure 4.4. Overall, 92% of the survey participants agreed to the decrease in beach cleanliness, in table 4.1. The pollution on the beach area is connected to the increasing number of tourists and business operations on shore. The traditional fishing village had no systematic institution to take care of the garbage. The lack of a clear instruction and ways to organize and dispose the garbage could be connected to this situation. The trash has become a burden that could damage ecological balance.

Figure 4.4 – Beach pollution

The coral reef health has declined due to the increased number of tourists and pollution. There were varying answers to the question on decrease in coral health, an environmental variable. To this question 56% of the participants answered "agree", and 12% "strongly agree", yet 32% answered "disagree" in table 4.1. Participant 128 said "There are a lot of dead coral now. In the earlier years before the tourism intensified. In those years corals were not disturbed by the humans, so they were in the best condition. Now as the tourism increased, the coral condition worsened". These responses were inquired further for clarification. MPA administration has acknowledged the worsening coral health situation around 2010. Furthermore, the efforts to improve the coral reef health were made. The results are revealed by 32% of

participants who consider that coral reef health did not change, in table 4.1. Commenting on this improvement, participant 145 answered "Since 2010 the condition of corals has become better because the marine park department is working on growing new coral. The rate of dying and fresh collar is equal, where the amount of new and dying corals equalizes each other". The respondents had different points of views regarding coral reef health. The differing views could be related to the fact that not every villager possesses a deep and professional understanding about coral reef health. A research conducted by "Reef Check Malaysia" indicated since 2009 coral cover surrounding Perhentian Islands has been decreasing (Hyde et al. 2013).

To the question on fish stock decrease, 60% participants answered that there is a decline in fish stock while 40% answered no change in table 4.1. Change in the existing fish stock is an example of environmental variable. One of the reasons related to change in fish stock is attributed to MPA mismanagement, which is an institutional variable. The MPA management forbids fishing in 2 nautical miles from the shore, so fish stock should be growing. However, MPA rules have not been enforced effectively. MPA policy makers and initiators in the federal government did not consult with the local fishermen when they made the decision on the fishing ban. As a consequence, this regulation has a limited social approval on the local level. Local fishers still fish in secret and get caught. The figure 4.5 displays fishing gears that is used by villagers, at night time.

Figure 4.5 – Traditional fishing gear

Although, MPA administrative agents catch local traditional fishers, they are not effective against outside large scale trawl fishers with faster and larger boats. On the issue of illegal fishing, participant 131 noted "Outside trawl fishermen are taking all the fish which causes the fish inside 2 nautical miles to decrease. Now people are dependent on fish from the mainland market". The figure 4.6 shows the outside trawl fishing boat anchored close to the islands.

Figure 4.6 – Fish market and fishing ship

The Perhentian Islands' beaches were considered prime breeding grounds for turtles. The increasing number of people visiting and staying on the beaches is altering the ecosystem and habitat for turtles. On the topic of turtle sighting, participant 143 remarked "In the earlier years turtle sighting was high. Turtle sighting is decreasing and sighting is limited to only 1 or 2 sightings in a year at best". On the same question, participant 133 said "Now they are not coming to lay eggs, as much as old days, turtles might have gone to other places to lay eggs. This change could have happened due to the tourism development. Also, turtles are harmed by the fishing nets as they get stuck in there. Turtles might be dying because of mistakenly eating plastic bags thinking them as jellyfish. Jellyfish is turtle's favorite food". There are instances of tagged turtles around Perhentian and Redang islands that are nesting in a single as well as multiple nesting locations (Long and Azmi. 2017). To the question on turtle population decrease, 76% of respondents answered, there is a decline, in table 4.1. The decline of turtle population shows the change in environmental variable. This change is related to the increasing human presence and

tourism byproducts such as garbage. There is not much empty beach space left to lay eggs on the Perhentian Islands. All the beach areas have been targeted for tourism development and even forest areas have been modified and turned into construction sites. Many of the participants answered from the personal observation and had no professional or academic knowledge on turtle behavior. Based on observation, 16% of participants answered there is no decrease in turtle population, in table 4.1. At the same time participants acknowledged turtle sighting is a rare event, since turtles only come to lay eggs once a year so it is hard to determine their population size.

On water quality decrease question, 52% respondents agreed to the declining water cleanliness, 32% disagreed and 16% could not decide in table 4.1. The decline in water quality represents change in environmental variable. Even though water quality is a serious health related issue, participants showed little worry on this issue participant 127 said "In the 1980s the water was clearer, in the 1990s water quality decreased because people threw garbage to the water. Water quality got worse from 2000 to 2010, due to tourism development activities but improved from 2010-2017 because of the increased water quality awareness". Clean water is a scarce resource on the islands. Prior to the tourism development in traditional fishing society water usage and corresponding waste water volumes were minimal. Another problem lies in waste water management. The islands do not have sufficient water treatment facility and capacity to hold waste water for treatment. Furthermore, building a waste water treatment plant reaching all the houses and chalets is an expansive investment, thus its challenge to build a large scale water treatment facility. Many chalets release waste water to the sea through canals or directly to sea after treatment, but the treatments are done by the chalets privately. Figure 4.7 shows waste water going through the village and discharging to the sea. The failure in waste water management could pose health issues. Local people do not have concrete and feasible ideas about fixing the water related problems. As development intensifies and number of visitors increase, waste water will undoubtedly swell. One of the reasons to be wary of the polluted water is the potential adverse health effects to villagers and tourists swimming nearby. It could cause harmful effects in the long run for the villagers and tourists swimming and snorkeling around the shore.

Figure 4.7 – Waste water

The number of tourists, boats, local housing and tourism infrastructures has been growing steadily. Land-based constructions are both the cause and result of the rapid change. This type land-based construction development can be considered change environmental variable. They are the cause of the change because new constructions alter the physical characteristic and arrangement of the islands. They are results of the change in a sense that these developments happen in the context of tourism sector development. The tourism sector is supported by the economic expansion policies encouraging development. Focus group discussion participants identified the time periods of the land-based constructions by percentage in figure 4.8. The graph is divided development time periods into four parts and linked corresponding percentiles. The highest degree of development 55% happened from 2010 to 2017 and the second highest was 30% from 2000 to 2010, in figure 4.8. An ongoing construction is presented in figure 4.9. Participant 127 said "Tourism-related development activities on the islands intensified since 2000. Tourists started to recognize the Perhentian Islands as a tourists' destination which led to

an increase in their numbers". Participant 129 also stated "since 2000 tourist numbers increased at highest rate, and more and more chalets and other buildings were constructed to meet the demand". Participant 128 added "New Penghulu and upper management in the government allowed more buildings to be constructed as they understood that tourism could bring more income for the government and local people". Participants unanimously identified that the reason for constructing large number of buildings was to meet the tourists demand and obtain profit from tourism. During the 1980s and the 1990s, the village was essentially a traditional fishing society, only approximately 5% of current buildings existed at that time in figure 4.8. Participant 126 reflected that "Before 1988 the village had traditional houses. After 1988, wooden fishers' houses were constructed". During this period a small number of wooden constructions were built for the villagers to live in and provide adequate comfort comparable to the fishing lifestyle. From 1990 to 2000 the change started to intensify. Participant 132 stated "from 1990s tourists started to visit the islands, and villagers started to obtain boat driving licenses".
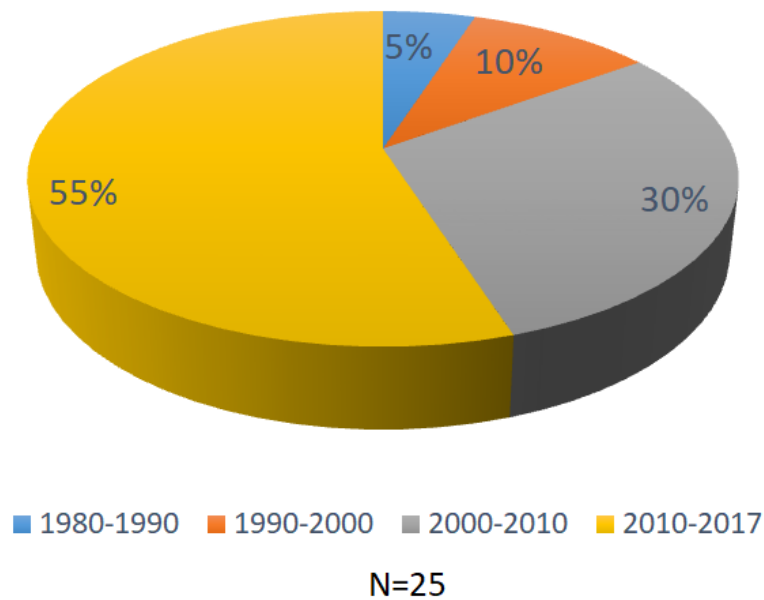
Figure 4.8 – Land-based development chart

Figure 4.9 – Land-based construction

4.3 Power Dynamics and Equity Concerns

4.3.1 Power Disparity among Stakeholders

The financial and other type of benefits from the development and business activities in the Perhentian Islands have been distributed unequally. This research has examined the potential reasons of unequal distribution. The various types of benefits obtained from the rapid change process tend to reinforce ongoing changes. However, not everybody involved in this process is equal in terms of their benefits. Consequently, those who receive the highest benefits have the highest interest in not working to stop the process of rapid change. One of the reasons of growing income differences is the existing power disparity. The power disparity among the stakeholders and factors influencing change are analyzed through power cube framework which is introduced in chapter 2.

The power cube has three dimensions and each dimension have three parts shown in figure 4.10. This framework categorizes and divides the elements of power and provides a visual representation of the sophisticated social constructs. The elements in the cube are adjustable according to the research purpose, in other words they are non-static, but dynamic in essence (Gaventa. 2005).
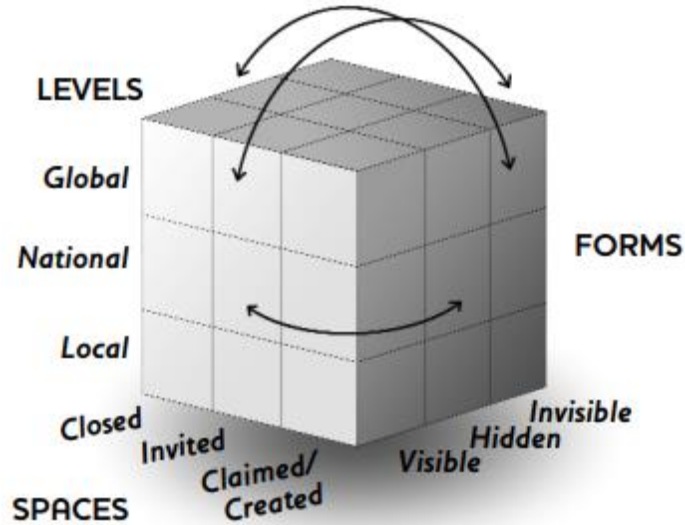
Figure 4.10 – Power cube (Gaventa 2006)

The key people involved in the process of rapid change are grouped based on responses from the research participants. The grouping is ethnically based, because research participants chose to divide and categorized people in this way. The 25 survey participants did not show negative connotation or preference when grouping people by ethnic background so the stakeholder grouping should not pose bias. Moreover, groupings do not hold discriminatory characteristics. Five groups are identified by the local participants and their involvement in the rapid change process varies when analyzed through power cube framework, in table 4.4. Research object column divides the key social groups in the rapid change process. The stakeholder groups in Perhentian Islands consist of local villagers, mainland ethnic Malays, mainland ethnic Chinese, title holders, and foreign workers. These five stakeholder groups fall under demographic variable and their interaction and power dynamics can be analyzed further. The island villagers call people coming from mainland Malaysia, the mainlanders. Then local villagers divided mainlanders by their ethnic background. Malaysian population is broadly divided into three ethnic groups Malay, Indian and Chinese. The three ethnic groups in Malaysia are Malays, Chinese and Indians, and even though all of them are Malaysian citizens, the ethnic divide exists.

For our research purpose two ethnic groups namely Malay and Chinese are relevant because there are almost no Indian ethnic groups in Perhentian Islands. The ethnic Chinese

Malaysians live predominantly in urban locations and have an influential presence in business and finance sectors. Thus, they are respected for their hard work. The ethnic Malays from mainland in this circumstance are either tourists or business investors and their power dynamics analyses are resented in table 4.4. The wealthy ethnic Malay business persons who are involved in businesses are predominantly former or current government officials. These two stakeholder groups benefit more than local villagers and foreign workers from tourism development because they are investors and owners of the businesses on islands. Their business and political connections and resulting problems are expressed by participant 118 who stated "The problem becomes political, because government leases the land. A businessman with government connections buys or rents the land and builds a construction. Then those people rent shops to the locals, for example there is a building in the village with 10 shops. 10 shops are rented out separately for 4000 ringgit per month".

Title holders can be from any ethnic group. These are the people who received federal or state honorary titles from the government or one of the Kings. The title holders do not have exact counterparts in the western society. Even though titles and medals exist in the western society, they do not have the social power or prestige comparable to the Malaysian title holders. The title holders' prestige has overwhelming influence on people's mind and it provides opportunity to get around business regulations such as obtaining licenses. Title holders benefit from tourism development comparably more than villagers and foreign workers because they would most likely hold management positions in business operations.

Another stakeholder group is foreign workers. In general, foreign workers come from neighboring countries such as Indonesia, Bangladesh, and Nepal to do physical labor. The northern Nepalese foreign workers, in general, are employed in guard or security duties. The Indonesian and Bangladeshi workers are, in general, employed in construction jobs. The chalets and buildings on the islands are constructed by the workers from Bangladesh and Indonesia. This stakeholder group mostly performs duties that require physical labor. Moreover, this group benefits less than other stakeholders because in most cases they hold job positions that are paid less than other groups. It does not mean that all of them receive low salary.

Table 4.4 – Main social groups' power dynamics analysis

Research object	Power Cube Framework			Status	
Key groups in the rapid change process	Forms: (visible, hidden, invisible)	Spaces: (closed, invited, created)	Levels: (international, national, local)	In short term	In long term
Local Perhentian Islands' villagers	Visible	Invited	Local	Winner	Potentially loser
				Benefit more than foreign workers	
				Benefit less than Mainland ethnic Malay, Chinese and title holders	
Mainland ethnic Malays	Visible	Invited	National, Local	Winner	Potentially loser
				Benefit more than local villagers and foreign workers	
Mainland ethnic Chinese	Visible, Partially hidden	Invited, Partially closed	National, Local	Winner	Potentially loser
				Benefit more than local villagers and foreign workers	
Title holders	Visible, Partially invisible	Invited	National, Local	Winner	Potentially loser
				Benefit more than local villagers and foreign workers	
Foreign workers	Visible	Invited	Local	Winner	Potentially loser
				Benefit less than all other stakeholders	

The key groups of stakeholders are analyzed through three dimensions of power cube framework. Form dimension reveals visible, hidden and invisible facets of the power. Space dimension tells closed, invited or created character of the particular object. Level dimension disclose the vertical institutional structure involved in the research object. In this research, levels are international, national, and local.

The villagers have a visible form of power in the rapid change process. Their actions and intentions are clear to locals, outsiders, and government officials. The villagers act in invited space where they can participate in development and business activities, in other words they are allowed to participate in this process as shown in table 4.4. However, in times their participation can be overpowered by the other groups. For example, villagers do not have the financial means to compete against outside investors, investing in the islands. The villagers are active at a local level and have minimal activity at the state level in table 4.4. Other than that, the village people's influence or presence is negligible. Villagers participate in business activities and have benefitted from the changes happening in the islands. However, those who wanted to stick to the traditional way of fishing have received the least amount of benefits from this change, and even lost their sustenance and culture along with it. Participant 127 said "I don't disagree with government, but the local people want government to give permission to fish in areas surrounding the Islands. Some locals are unemployed and have to fish for food. We all agree that rules are protecting the coral reef, but we want the rules to allow local fishers to fish while at the same time protecting the resources from the outside fishers that damage corals". Participant 128 added "When the ban started, it was unfair for the local people because they could not fish anymore. Most of the fish stay in the marine park. When the outside fishers use trawl net to fish in the marine park territory, the marine park department doesn't take action. Trawl fishing boats move faster and escape. Local fishing methods take longer time to catch fish and that's why they get caught by officials while outside fishers move away from the MPA zone before anyone intercepts them". The traditional way of life and fishing culture existed for hundreds of years but all of that is gradually disappearing. Vanishing traditional culture is one of the treasures that most likely cannot be reintroduced again. One of the examples of villagers trying keep the cultural dress code is shown figure 4.11. This notice board is installed by a local organization Jawatankuasa Kemajuan dan Keselamatan Kampung (JKKK) Pulau Perhentian or in English Pulau Perhentian village security and welfare committee (VSWC).

Figure 4.11 – A notice on a board positioned at the village entrance

The island villagers identify people coming from outside of their islands as the mainlanders, which is to signify all Malaysians who are not from Perhentian Islands. The mainland ethnic Malays have visible form of power and are allowed to participate in the development activities in invited spaces in table 4.4. They come from national and local state levels as shown in table 4.4. Those who visit the islands for the purpose of tourism definitely benefit. Also, the business people invested to the island infrastructures, such as shops, chalets and restaurants, have financial gain and incentives to enlarge their properties. The ethnic Chinese people also have visible power in the form of tourists and investors in table 4.4. Participant 133 explains the growth of business practices involving villagers and outsiders by saying "Local people are involved in the development activities, and they are involved as workers and as business owners. In Long Beach, developers are mostly outsiders. Half of the locals are workers and the other half is owners of the businesses. Right now local business owners are decreasing because of the increasing outside investment from mostly KL Chinese and a small percentage of Malay outsiders". The participant 140 further explained this arrangement by saying "ethnic Chinese Malaysians aren't allowed to buy land in Perhentian Islands". Consequently, they

employ ethnic Malays as front persons. This arrangement makes them partially hidden investors. The ethnic Chinese are allowed to participate; they are acting in invited space. The ethnic barriers still exist in business practices. Participant 132 said "The investors are from Kuala Besut and KL. The land was initially owned by the locals, but people transferred land rights or rented out land. Ethnically Malays can buy the land but not others". With regard to different rights held by the ethnic groups, the existing social and legal barriers create partially closed space for ethnic Chinese as shown in table 4.4, where they are not appreciated nor encouraged to act publicly. The Terengganu state is predominantly ethnically Malay, so ethnic Chinese come from urban centers such as Kuala Lumpur to visit and invest in local businesses. Overall, they are benefactors and benefiters of the rapid change.

The national and state title holders come from all ethnic groups of the society. The titles are given to the individuals who have done something exceptional and substantial for Malaysia or for a particular state. These titles are given by the federal King or Kings of each state. A title holder would not actively be involved in the day to day business activities, but own the business while other people operate it. So, it is a visible form of power when people can see the identity of the owner in table 4.4. There is an invisible side to this as well because cultural norms influence most Malaysians to show respect to title holders and give high respect. In some instances, people overlook title holders' mistakes and even give preferential treatment in obtaining business licenses. This is an invisible power in table 4.4 because it is exercised willingly and inconspicuously. Title holders work in invited space in table 4.4 and are allowed to participate in the tourism development progress. They can be from various backgrounds coming from both national centers as well as state levels in table 4.4. The high level politicians and business persons in Malaysia usually obtain some type of title. The title holders are typically winners in this rapid change because of their successful tourism businesses in the Perhentian Islands shown in table 4.4.

Foreign workers in the islands are from South Asian nations, such as Indonesia, Bangladesh and Nepal. They earn income by working publicly in construction sites, chalets and restaurants and, therefore, hold a visible form of power in table 4.4. The business owners hire them for their cheap labor and to reduce overall business cost. These people work long hours for less salary than villagers and hold the least amount of power to make decision or change anything. They are in the invited space of power in table 4.4 because companies on the islands

offer them job. These people work and live locally near their work places. The stay and work in the islands because the salary they receive is higher than their native countries. From this perspective they can be considered winners from the change in table 4.4. However in many instances their salary is less than other stakeholders.

The tourism sector development has benefitted these five stakeholder groups since tourism businesses started operate on Perhentian Islands. Nevertheless rapidly expanding tourism related development on islands might not be able to continue indefinitely. The Perhentian Islands' ecosystem might not be able to sustain unrestrained business expansions and might reach a point of social-ecological catastrophe in future. There is a possibility of such catastrophe happening in future if business development activities continue to accelerate. In this situation, in a long run all five stakeholder groups will lose out as shown in table 4.4.

4.3.2 Power and Equity

Besides key groups of stakeholders, there are documents and policies influencing the social-ecological rapid change in the Perhentian Islands. The table 4.5 shows various documents, rules, and regulations having powerful influence in the social-ecological rapid change. The factors mentioned in table 4.5 are institutional variables. The table 4.5 differs from table 4.4 by showing how non-human factors, such as the rules and regulations have power in society. The New Economic Policy (NEP) was an economic and business development plan since the 1970s to bolster growth and prosperity in Malaysia. Various economic sectors were encouraged to offer high level of employment to all Malaysians. This plan had a visible form power. At the same time the economic plans had a partially hidden form of objective shown in table 4.5, which is to equate economic and financial prowess in three ethnic groups by providing higher opportunity to the ethnic Malays while limiting opportunities to ethnic Chinese and Indians (Torii 1997). The ethnically based favoritism had some success, but brought in an unhealthy economic system, where people are treated differently based on their racial background.

For the Perhentian Islands' ethnically Malay villagers, the national economic plans offer opportunity to develop economically. Participant 143 praised the tourism sector by saying "I agree that income increased rapidly, I am satisfied with the income from the tourism sector. The income increased several folds. We all agree that the main source of income is from tourism

related activities. More tourists equal more income". Then again, the social-ecological costs of the development have not been well thought out. The economic plans are created by the people and work for its intended purpose in economic space. The high level policy planners create the plan, discussing in a small circle of experts, not involving all the stakeholders. This situation creates a partially closed space in table 4.5. This is an example of vertical and authoritarian power structure.

The vertical governance structure's weakness lies in the disconnection between levels of stakeholders such as not taking into account grass root level issues seriously. Participant 144 said "The older people who don't work and depend on the children's income have difficulties. Single mothers have low level salary and they cannot work for long hours. These people are getting 600 ringgit per month from government, but the cost of living here is 1000 ringgit per month. The license is required to open a business, but single mothers have hard time obtaining license. If single mothers do business illegally, they can be sued by the government". The national economic plans are carried out in national, state and local levels in table 4.5 achieving economic success, while endangering the environment and the traditional way of life.

Table 4.5 – Official regulations' power dynamics analysis

Research object	Power Cube Framework			Consequence
Key documents influencing rapid change process	Forms: (visible, hidden, invisible)	Spaces: (closed, invited, created)	Levels: (international, national, local)	Success and/or failure
National Economic Development Plans	Visible, Partially hidden	Created, Partially closed	National, Local	Have successes and failures
MPA regulations	Visible	Created, Partially closed	National, Local	Have successes and failures
State regulations	Visible	Created, Partially closed	Local	Have successes and failures
Religious rules	Visible, Partially invisible	Partially closed	Local	Have successes and failures

MPA regulations have been placed to safeguard marine habitat such as coral reef and fish stock surrounding Perhentian Islands. The rules and government administrations in charge of MPA have visible forms of power in table 4.5. The islanders know and realize the rules and what has been done to preserve the environment. The regulations have been created and they operate in certain areas of space. The administration is responsible for carrying out rules and regulations. These processes are closed to the local people in table 4.5. The local stakeholders are almost completely left out from management of the MPA. The MPA is directed from the federal government, specifically the Department of Marine Parks in the Ministry of Natural Resource and the Environment. MPA in the Perhentian Islands have some success such as reintroducing coral reef in depleted areas and supporting existing coral reefs. On the other hand, it criminalized the life-style of local fishing altogether, making villagers de facto law breakers. Also, the fish stock in the MPA has not gone up because MPA administration does not protect the 2 nautical mile zone from outside trawl fishers. Some participants even said the fish stock is decreasing.

The Terengganu state has the jurisdiction over the developments activities in Perhentian Islands, while MPA has the jurisdiction within the two nautical miles area surrounding the islands. The operational licenses for tourism development projects, constructions and businesses are approved by the state. The state official rules hold a visible form of power in table 4.5, requiring all the activities in islands be registered and approved. The rules are created by the state parliament in a partially closed space in table 4.5 as the islanders are not involved in the rule-making or enforcement processes, which shows the existing power structure is vertical or top down. This is an example of local level power. There are successes in the economic sphere such as the rising income, investment and business profit in the Perhentian Islands.

Nevertheless, the growing size of infrastructures, number of people and anthropogenic interferences in the long run could cause irreversible ecological damage. The rate of development and feeling of powerless was expressed by participant 140, "Beach construction isn't allowed, but this question is political. Political influence bends rules. Building Mosque and other big investments require Sultan's approval. Money decides everything. Most investors are outsiders and companies rent the land and build constructions on the beach. The politics and business are the same". The current intensity of the rapid social-ecological change is producing short term successes and long term potential failures.

Malaysia practices a dual legal system. Secular and Islamic religious rules are followed side by side. Islamic legal system is called Sharia or Syariah in Malaysia (Farid 2012). This court system follows the religious ethical and moral codes. The enforcement intensity of the religious rules differs state to state. The Kelantan and Terengganu states are the stronghold of the Malaysian Islamic Party, in short PAS, a political party strives to strengthen Islamic moral standards. This party aims to establish Islamic State and Islamic criminal justice system called hudud (Stark 2004). The Sharia and hudud punishments are generally stricter than secular punishments for the similar crimes, because the crimes under Islamic jurisprudence are considered acts against God's instructions. Moreover, the federal King of Malaysia serves as a religious head, thus speaking against or breaking the religious rules may pose twofold consequences. Twofold consequences can be seen as an act against God and an act against the King.

The religious rules exercise a visible form of power in table 4.5. Villagers know what kinds of actions are illegal in religious context, for example drinking any type of alcohol is illegal in Sharia law. The punishment for this crime is three lashes. Sharia has a partially invisible form of power in table 4.5 since the religious concepts are indoctrinated from the young age and nobody even thinks about it critically. The Sharia law functions in a partially closed space in table 4.5 where only religious leaders have the right to speak or make decisions. Each state in Malaysia has varying degrees of intensity of Sharia regulations and courts depending on local tradition. So the levels of power are state and local in table 4.5. Like any legal system, Sharia's aim is the betterment of society and it successfully instructs not to steal and commit adultery, etc.

At the same time, the growth of the tourism industry in Perhentian Islands pushes liberalization of the religious rules. The international tourists are accustomed to visit restaurants, entertainment activities, and alcohol drinking establishments. The lifestyle changes in the islands are altering previously established cultural and religious norms. The figure 4.12 presents businesses that did not exist in the traditional Malaysian villages. The massage house is operated by masseuses from Thailand and the outside bar on the right is selling alcohol openly. This is an example of ongoing cultural rapid change in the Perhentian Islands.

Figure 4.12 – A massage service poster and an open bar

4.4 MPA Management

The Perhentian Islands' villagers have practical local knowledge and experience about the management activities of MPA in Perhentian Islands. MPA management is used as a focal point to address management issues in Perhentian Islands. The findings about MPA management can be useful in improving overall SERS governance framework in chapter 2. To address management aspects of the MPA, the villagers were asked to measure current management efficiency. The measurements were made based on villagers' knowledge regarding MPA rules, information distribution, rule enforcement, funding and capacity, existence of rule breakers, and degree of participation in table 4.6. After inquiring opinions on the MPA management, the villagers' were asked to share their opinions on MPA management improvement in table 4.7. The participants' opinions in table 4.6 and table 4.7 regarding MPA management is categorized under institutional variable. The topics on potential MPA management improvement included villagers' willingness to participate, stakeholder cooperation, and stakeholders' knowledge sharing.

Table 4.6 shows villagers' opinions on the MPA management efficiency. The participants' responses on degree of understanding MPA rules was 96% in agreement, combining "strongly agree" 80% and "agree" 16% answers in table 4.6. This indicates that the majority of participants understand the rule set by the government. The villagers' opinions regarding the management of

MPA information distribution received scores of 40% "strongly agree", 32% "agree" and 28% "disagree", in table 4.6. The combined scores of participants thinking that there is a sufficient degree of information on MPA management activities make up 72% in table 4.6. This score tells that local people receive information about ongoing management activities. However, 28% of participants thought there is a lack of information on MPA management, so there is room for improvement.

The following question on MPA management was to figure out the institutional capacity to implements the policy. The question asked whether MPA management has enough human and financial means to act. The responses were 48% "strongly agree", 20% "agree", 16% "neither agree nor disagree", and 16% "disagree" in table 4.6. Even though more than half of the participants agreed MPA management has sufficient funding and human resource, 16% of participants were unsure and 16% thought it lacked funding or human resource required to work effectively in table 4.6. Some of the participants were worried about how MPA raise fund. Participant 121 said "In the past few years the marine park fee collected from the tourists increased from 5 – 30 ringgit but nothing is done with the income. When the tourists have problems and accident such as broken bone during snorkeling, marine park department doesn't take action. The marine park department should use the collected money to help tourists", and participant 116 added "Marine park fee increased from 5 to 30 ringgit. If the charge is lowered to 10 ringgit the more tourists might come and improve the economy of the village".

Table 4.6 – MPA management assessment

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Do you think villagers understand MPA rules?	80%	16%	0%	4%	0%
Do you think villagers have sufficient information on MPA management?	40%	32%	0%	28%	0%
Do you think MPA rule enforcement is effective?	32%	24%	0%	44%	0%

Do you think MPA has adequate funding and employees?	48%	20%	16%	16%	0%
Do you think there are MPA rule breakers?	32%	52%	0%	16%	0%
Do you think villagers participate in MPA management?	12%	24%	0%	8%	56%
N=25					

The next question was on MPA rule enforcement. In this question, the participants in disagreement were higher than in the previous question. Participants answered 44% "disagree", 24% "agree" and 32% "strongly agree" in table 4.6. The combined responses in agreement were higher than answers in disagreement, but it showed there is a problem with MPA rule implementation on the grass roots level. On this topic participant 103 said "MPA boats were supposed to regulate but don't show up. Monitoring and enforcement of rules are missing. Fishers fish at night. During night time, fishers fish on the other side of the Island. There is no use of rules, people will break the rules. The problems are that people break the rules, throw garbage, and fish illegally. Rule enforcement is the problem, things aren't been done in a straight way, and the regulations are bent. On the sand shore, building a construction isn't allowed, but establishments are still being erected. Development isn't done systematically; companies are doing what they want".

Then, we inquired if there are people breaking rules set by MPA. The responses were 32% "strongly agree", 52% "agree" and 16% "disagree" in table 4.6. Adding up "strongly agree" and "agree" makes 84%. This means the majority of the villagers think there are rule breakers. This number tells the ineffectiveness of policy and regulation set by the MPA management. Villagers are either dissatisfied or disagree, or altogether dissatisfied and disagree with the regulations. On the reasons behind people's dissatisfaction, the participant 108 said "If the MPA rules are beneficial for the locals, we will support the rules. However if the rules are unfair, for example Marine Park doesn't take action against outside fishers, we don't support. Marine Park always confiscates local people's fishing gear but not outsiders' gears. This is the reason of our dissatisfaction". In this situation a way to improve the problem is to allow people to voice their opinions and come to terms where all the stakeholders are satisfied. Next question was, whether villagers can participate in the MPA management. The answers were 56% "strongly disagree",

8% "disagree", 24% "agree" and 12% "strongly agree" in table 4.6. More than half or 64% participants were in disagreement and thought the villagers' participation in MPA management was minimal. In this situation the people's voice has a hard time to reach decision makers in higher level institutions.

The following questions were focused on local villagers' opinions on improving the MPA management. The villagers' opinions may provide ideas on correcting the social-ecological issues in Perhentian Islands. The research questions were formulated to ascertain villagers' degree of willingness to be integrated in the MPA management procedures. The question on discerning local villagers' willingness to participate in MPA decision making got an impressive feedback, 68% "strongly agree", 20% "agree", and 12% "disagree" in table 4.7. The combined scores of "strongly agree" and "agree" were 88%, which tells that villagers predominantly want to be part of the management's decision making procedures.

After that, the next question inquired, whether villagers' participation in the MPA management is crucial. The responses were 92% "strongly agree", 4% "agree" and 4% "disagree" in table 4.7. Adding "strongly agree" and "agree" makes up 96%. This percentage shows almost every participant thought villagers' participation in MPA management will make a difference. The participant 144 has expressed personal opinion on the existing problems between stakeholders "Government isn't very effective. It's not effective because it's unfair to the fishers. When the marine park was established, they banned fishing, and conserved the coral. The coral conservation attracted tourists and support businesses. The tourism benefited local people. Tourism brings gain most of the year, tourism is the only source of income for the people".

Table 4.7 – Opinions on improving MPA management

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Do you think villagers are willing to participate in MPA decision making?	68%	20%	0%	12%	0%
Do you think villagers' participation in MPA management is important?	92%	4%	0%	4%	0%

Do you think cooperation between stakeholders is important?	88%	8%	0%	4%	0%
Do you think stakeholders learning from each other are important?	96%	4%	0%	0%	0%
Do you think stakeholders' cooperation is important for improving MPA management?	44%	20%	4%	28%	4%
N=25					

The following step was to figure out villagers' perspectives on government agencies and stakeholders relevant to the social-ecological rapid change in the Perhentian Islands. Out of various social groups present in Perhentian Islands, participant 128 pointed out several stakeholders such as government bureaus and agencies "The government agencies involved in the development are marine park department (jabatan taman laut), district council (majlis daerah), fisheries department (jabatan perikanan), and department of environment (jabatan alam sekitar).

There are non-government organizations in Perhentian Islands such as boat taxi and local women's organizations. They have minimum influence in the marine park management. Currently the cooperation between government agencies and non-government stakeholders are not in sufficient level. Villagers expressed that the lack of synergy between the stakeholders create feelings of distrust, disbelief, and wariness. To capture opinion on this nuanced issue, villagers were asked whether local people thought cooperation between the stakeholders is important. The answers were 88% "strongly agree", 8% "agree", and 4% "disagree" in table 4.7. Overall 96% of the participants thought the cooperation between the stakeholders is crucial for the success in MPA management. Participant 137 mentioned that actions should be taken by the government in response to the local people's requests "Government should soften the marine park rules to allow local people to obtain more marine resources. Also government should do more conservation and maintenance activities on marine resources to increase the fish and turtle population".

In a similar manner participant 146 remarked "Government should begin a campaign to increase awareness of Marine Park's importance in Malaysia. Government should start a tourism promotion campaign advertising Perhentian Islands globally to increase the tourists coming from

foreign countries. We need government encouragement to create specialty souvenirs and hand craft products made from materials on Perhentian Islands that tourists can buy. The hand craft products can be made by the local resources such as coral and fish".

Several other participants expressed and shared valuable local knowledge to improve the MPA management. For example participant 147 said "MPA can open a small seashore area to allow fishermen to fish, for their own benefit. Traditional fishing won't harm the fish population; the traditional way of fishing doesn't reduce fish stock. Government should give each family a boat for taxi service. Government needs to create a market for the fishermen to sell fish. Government should create a place to process dry fish (salted and dried traditionally conserved fish) for the tourists" and participant 143 added "Marine Park and police need to protect the fish resources from the outside fishers. Maybe the underwater constructions can be installed to increase the fish stock (artificial reef). To increase the turtle number, the conservation procedure can be implemented. The young turtles become easy prey for the other animals".

The cooperation can be expressed in a number of ways, and one of them is learning from each other. To understand what people thought about this aspect of cooperation, the villagers were asked, whether villagers consider if it is important for stakeholders to learn from each other. The responses were 96% "strongly agree" and 4% "agree" in table 4.7. This was one of the few instances when 100% of the participants agreed on something. This tells that the villagers are open to the new ideas and they are willing to share their own knowhow with other stakeholders. Participant 138 explained the existing situation "If, Marine park department sends a letter to Penghulu (village Chief), while willing to listen to the local people, the regulation will be considered acceptable. In this situation people will join the conversation. Right now the MPA management isn't interested in the local people's opinions so people are sluggish to join the conversation. Local people are willing to participate with the hope that their voice will be heard by the government".

After that, the next step was to discover villagers' opinions on the application side of management. This was done by asking whether cooperation can actually improve MPA management. The responses were 44% "strongly agree", 20% "agree", 4% "neither agree nor disagree", 28% "disagree" and 4% "strongly disagree" in table 4.7. The answers were mixed and wide-ranging. Although, the majority of participants told the stakeholders' cooperation will

definitely improve MPA management, they presumed in reality that MPA management will not follow through with it. Participant 112 voiced personal opinion about the governance structure "Government is the only decision maker; there is no participation from the local people. The locals support the management for MPA coral conservation initiatives. Nobody disagrees with the MPA, but the rules aren't fair for the local people. When they created Marine Park, fishers didn't benefit from it. They chased out fishers from the fishing area". Another participant 119 commented "If the marine park department invites the local people now, we won't join because we know that the decisions are already made before the meeting and the meeting is only to tell us the decisions. Even if the discussions happen, the marine park department will already have decisions. Marine park department doesn't tolerate ideas presented by the local people. Government should act on the people's opinions, not just listen. There must be tolerance from the government agencies". The reasoning behind many respondents' disagreement with possibility of improvement in MPA management is based on the lack of trust between stakeholders.

The MPA management questions were focused on what type of management attributes is desired by the villagers. These villagers' opinions might not be perfect by any standard, but these were aspirations common among the villagers. According to the participants' answers, MPA management should encourage villagers' participation because, by doing that, the villagers can voice their issues in a timely manner and find solutions. The second point was the importance of stakeholders' cooperating with each other and learning from other stakeholders' mistakes and successes. This kind of cooperation provides a chance for stakeholders to build trust and share knowledge.

CHAPTER 5

Discussion

5.1 Analysis

The goal of this research is to examine key attributes of rapid social-ecological change in the coastal-marine systems in Perhentian Islands and understand their implications for governance. There are three objectives in this research designed to answer the research goal. The first objective is to identify and characterize the nature of rapid social-ecological change taking place in the study site and the driving factors influencing it. The second objective is to understand various power dynamics that contribute to and result from of rapid social-ecological change through power cube framework and to recognize and analyze the equity concerns inherent in the ongoing rapid social-ecological change. The third objective is to examine governance implications on ongoing social-ecological rapid change and suggest ways to improve it by applying adaptive co-management as a governance component.

The regime shift explains how small incremental changes or a large scale push shifts the existing equilibrium state to another equilibrium state (Scheffer and Carpenter. 2003). A major problem related to regime shift is about understanding potential negative impacts that follow after stable state shifts (Prowse et al. 2014). Regime shift has a potential to affect both social-ecological dimensions, thus it is important to have a big picture of the change. Anthropogenic influence on the environmental regime shifts is a well-documented area which has surged with the use of modern technology, growing population and globalization. Moreover the ecological impacts of regime shifts have substantial effect on the people's wellbeing. This research aims to have a holistic perspective of viewing ongoing rapid change to address these issues by incorporating social-ecological perspectives.

The existence of social-ecological rapid change in the Perhentian Islands has been presented in the previous chapter's table 4.1, by demonstrating multiple facts. During the focus group discussion participants were not able to say exact dates when the changes started to speed up, but they revealed that changes became increasingly noticeable in the last two years. This

indicates the social-ecological change has been slowly speeding up since the 1980s and has become a fast change approximately in the last two to three years. Speed of change covers both social-ecological dimensions, transforming cultural and ecological systems. Furthermore, the term ongoing rapid change covers both social-ecological dimensions as shown in table 4.1. The social-ecological rapid change in Perhentian Islands covers a wide variety of ecological issues from turtle population to water quality. Moreover, table 4.1 shows evidences of rapid change in social dimension including women's employment and income change. These issues indicate interconnectedness between social-ecological dimensions and the two dimensions' possibility of affecting one another.

The social-ecological rapid change in the Perhentian Islands has multiple driving factors. Among them, the main driving factor is the tourism sector's growth which fuels economic development and infrastructure expansion, thus disturbing ecological balance as shown in figure 4.1. The tourism business' expansion as driven by the monetary profit and the speed of land-based development has been intensifying in the last 37 years in figure 4.8. The pursuit of profit and business expansions could be dangerous in a sense that it might reach ecological threshold level, causing irreversible ecological damage. Various stakeholders in Perhentian Islands participate in this rapid change process, in different degrees as shown in table 4.4. Out of many stakeholder groups pushing tourism development, the Kampong Pasir Hantu residents will be the most affected group, if this social-ecological rapid change irreversibly damages the Perhentian Islands' ecology. The reason why Pasir Hantu villagers will be affected more than others is because Perhentian Islands are their home.

To minimize the negative outcomes of social-ecological rapid change on stakeholders, governance approaches should be adapted to the local condition. The adaptive co-management approach as a component of SERS governance is suggested in this case to potentially reduce the negative impacts related to social-ecological rapid change. The reason for using adaptive co-management theory is that it has a potential capability of managing social-ecological and cross-dimensional issues (Armitage et al. 2008). It has the potential to manage both social-ecological issues by encouraging collaboration between the stakeholders. Moreover, RS management should include adaptation and mitigation components to balance out the cost and benefit between the social groups to reduce negative social impacts (Crépin et al. 2012). During RS there can be emergence of unpredictable social-ecological issues, thus in order to manage those situations the

management mechanism has to incorporate knowledge sharing and cooperation between the stakeholders. The adaptive co-management can be helpful in mitigating the cross-dimensional problems by encouraging and facilitating learning and collaboration procedures between stakeholders (Armitage et al. 2008). This theory provides a systematic method to acquire knowledge from the past achievements and failures then support activities between stakeholders to learn and adapt to the challenges (Schultz et al. 2011). The co-management approach fits in this kind of situations where diverse stakeholders attempting to coexist and share the benefits of the particular resource. Although, adaptive co-management approach presents potential options to improve the management mechanism in Perhentian Islands, there could be unforeseen obstacles related social-ecological rapid change, which is hard to predict. It is a potential management option to improve the existing situation, and does not provide an ultimate solution to all the problems related to social-ecological rapid change.

5.2 Findings and Discussion

This research suggests a framework for SERS governance in figure 2.1. SERS governance framework in figure 2.1 presents a framework with 3 component parts. This framework places SERS governance in the center. Then adaptive co-management, power cube framework and stakeholder participation are positioned on three sides. The connecting lines demonstrate the interconnected nature of SERS governance. It is a dynamic condition where each part affects the other parts. The power dynamics is analyzed through power cube framework which is introduced in chapter 2 and it recognizes diverse stakeholders, distinct rules and regulations connected to the social-ecological regime shift in the Perhentian Islands. Power cube framework in this context is used as a tool to analyze different stakeholders' power. The power cube framework aids the analysis of stakeholder groups' vulnerabilities, costs, and benefits related to the power holders. Any stakeholder group in the regime shift process has a chance to be impacted negatively. This means a stakeholder groups' power analysis can be useful in suggesting a governance mechanism, because it gives extra information about stakeholders' power dynamics. The framework presented in figure 2.1 is not an ultimate solution to govern SERS. It is a potential way of governing SERS by incorporating adaptive co-management approach as a component of

governance to strengthen stakeholder collaboration and knowledge sharing. This approach can be favorable for all the stakeholders because reducing SERS's long-term negative impacts will benefit them all.

In order to show, how the framework in figure 2.1 could function, the three research objectives have to be answered. The following subsections demonstrate findings related to 3 objectives of the research. The subsection "5.2.1." answers objective 1 of the research and discusses findings related to social-ecological rapid change in Perhentian Islands. Moreover, it concludes that social-ecological rapid change in Perhentian Islands could become SERS if it continues as it is. Some of the gathered facts related to Perhentian Islands' social-ecological rapid change correspond to the SERS definition. In order to identify SERS case, it has to match definitions of both RS and SERS. RS is defined accordingly "We define a regime shift as a substantial reorganization in system structure, functions and feedbacks that often occurs abruptly and persists over time" (Crépin et al. 2012). Ecological RS is described as "Ecological regime shifts are large, abrupt, long-lasting changes in ecosystems that often have considerable impacts on human economies and societies" (Biggs et al. 2009).. RS can negatively affect human well-being as well as ecosystem (Scheffer and Carpenter. 2003). Some of the definitions of SERS include following descriptions "We define social-ecological regime shifts as abrupt, long-term and significant changes in linked systems of people and nature with uncertain implications for ecosystem services and human wellbeing" (Nayak and Armitage. 2018). SERS may have consequences on ecosystem services and human wellbeing (Nayak and Armitage. 2018). SERS has impacts on both ecosystem and human well-being, thus it is imperative to study RS in the realm of social-ecological context (Nayak et al. 2016). The social-ecological changes that are leading to SERS in Perhentian Islands include demographic variables such as increase in women's employment, children's school enrollment and income as shown in table 4.1. Other demographic variable changes include increase in villagers' contacts on mainland Malaysia in table 4.2 and participation in development activities in table 4.3. There are alterations in environmental variables such as decrease in water quality, coral health and turtle population in table 4.1. Another crucial environmental variable representing change on Perhentian Islands is increase in land-based construction shown in table 4.8.

The subsection "5.2.2." answers objective 2 of the research and discusses power dynamics issues on Perhentian Islands. The findings show the power dynamics and equity issues related to

the stakeholder groups representing change in demographic variable in table 4.4. These findings related to power dynamics and equity can be useful in SERS governance because these findings provide information on stakeholders. Having information on stakeholders' power dynamics can be an important factor in implementing adaptive co-management. On top analyzing stakeholder groups' power dynamics, power dynamics of institutional variables such as MPA regulations, religious rules, state government rules and economic plans are presented in table 4.5.

The subsection "5.2.3." answers objective 3 and discusses MPA management issues in Perhentian Islands. In this subsection MPA management is used as focal point to analyze existing management mechanism in Perhentian Islands. MPA management is a focal point example institutional variable that used to understand villagers' opinions regarding existing governance and management mechanisms in Perhentian Islands and potential ideas to improve them. Having a focal point example of management that is known by the majority of village participants provides an opportunity to assess and take villagers' opinions on improving the existing management mechanism. The MPA management was chosen as a focal point example because the majority of the village participants knew about it and had practical knowledge to discuss its effectiveness. The village participants assessed MPA management in table 4.6. Participants' concluded that MPA management doesn't have enough cooperation. Next, participants were asked to share their opinions to improve the MPA management in table 4.7. These findings indicate participants' desire to cooperate with other stakeholders, share knowledge and participate in decision making. This means Perhentian Islands' villagers want to have a management mechanism that promotes cooperation and knowledge sharing such as adaptive co-management. SERS can have long-term impacts that affect social-ecological systems (Nayak et al. 2016). In a changing condition such as SERS, the future can be unpredictable and challenging to prepare for. For this reason, adaptive co-management approach could be useful for reducing the potential negative impacts of SERS because it encourages stakeholders to learn from their past mistakes to overcome new challenges (Schultz et al. 2011). These way stakeholders could be prevented from making mistakes by learning from each other's successes and failures.

5.2.1 Social-Ecological Rapid Change in Perhentian Islands

The identified findings in this section regarding social-ecological rapid change in Perhentian Islands correspond to some of the definitions of SERS. The findings attest that social-ecological rapid change in Perhentian Islands has a potential of becoming SERS in future. The findings indicate that main driving factor of social-ecological rapid change in Perhentian Islands is tourism sector growth. The tourism sector's growth had various social-ecological impacts and in the future could cause irreversible change to the islands' ecosystem. Although the main driving factor of this social-ecological change is identified pinpointing exact threshold point is difficult. One of the challenges of determining threshold point is that social-ecological changes in Perhentian Islands are still continuing. Although there are multiple variables showing social-ecological changes taking place, those variables do not indicate a clear threshold point being crossed because social-ecological changes in Perhentian Islands are still progressing. One of the challenges of pinpointing a social-ecological change threshold in Perhentian Islands is that social changes take longer period of time to show a clear contrast between two social regime systems. From a historical perspective the findings show the change started from the 1980s with the tourism sector's introduction in islands. Then, the pace of change increased decade by decade. The rate of change has increased considerably since 2010 and it covers both social-ecological dimensions. The land-based construction development to promote tourism sector has transformed a traditional fishing village into a tourism industry based village with modern appliances. The dates 1980 and 2010 can be called when significant changes took place because land based development has brought technological development to the islands such as electricity and mobile phone. 1980 is an important date because from here on land-based constructions started and changed the living condition of villagers and physical characteristics of Perhentian Islands. For this reason the social-ecological change in Perhentian Islands has started from 1980 and still progressing. Another important date when a significant change took place is 1994. MPA was established on Perhentian Islands in 1994 and forbade fishing in 2 nautical miles surrounding the islands, consequently altering the life style of villagers.

This section answers objective 1 of the research and identifies and characterizes the nature of rapid social-ecological change taking place in the study site and the driving factors influencing it. The research participants identified primary and secondary driving factors of the social-ecological rapid change in the Perhentian Islands in figure 4.1. These percentages attributed to factors signifying the percentage of respondents defining them as driving factors. The primary

driving factors are the factors that participants thought the main influencing factors of social-ecological rapid change in Perhentian Islands. Moreover, the participants identified secondary driving factors because they wanted to point out the factors having influence in social-ecological rapid change but to a lesser degree than the primary driving factors. The primary driving factors were chosen accordingly as told by the participants: tourism activities 80%, outside fishers 8%, fishing 4%, trawl fishing 4%, and artificial reefs 4%. Out of many driving factors, participants thought the tourism activities had the highest influence because 80% of the participants answered they are the primary driving factors of social-ecological rapid change in Perhentian Islands. The secondary driving factors were identified in a similar way: construction 43%, tourism activities 13%, fishing 13%, trawl fishing 13%, outside fishers 9%, and artificial reefs 9%. Under primary driving factors, tourism activities were chosen, and under secondary driving factors, construction was chosen as the main driving factors leading to social-ecological rapid change on the islands. The land-based construction-related developments on the islands are changing the physical structure of the islands and enabling more tourists to visit the islands. The land-based construction depicted in table 4.8 shows environmental variable's intensity of development. As more tourists visit the islands; there will be increased tourism related activities. From here, it is evident that two main driving factors influencing the rapid change are connected. These two factors can be combined as the tourism sector factor which is the main driving factor of social-ecological rapid change in the Perhentian Islands.

The paradox of the tourism based development is that its achievement relies on the pristine untouched beach charm, at the same time; this business model is on a path of overusing the natural resource to the point of destruction. In other words, if left unchecked this progress could become a precursor to a harmful outcome, causing irreversible environmental and social degradation. The symptoms of degradation are analyzed further to reveal connections and causations. The interconnected aspects of the environmental and societal issues are highlighted, and examining one without the other will give an incomplete picture.

In chapter 4, the beneficial and detrimental aspects of tourism development are listed in table 4.1. The social-ecological changes in Perhentian Islands are characterized by demographic variables such as increase in women's employment, children's school enrollment and income. Also environmental variables such decrease in water quality, coral health and turtle population as shown in table 4.1 describe social-ecological changes that are leading to SERS. At first the

positive aspects of the tourism development will be stated, afterward the shortcomings. First of all, the tourism sector offers a chance to earn higher income for the local village people on the Perhentian Islands who were primarily dependent on fishing. In the table 4.1, 56% participants strongly agreed and 28% agreed to the increasing income due to the tourism development. In general, 84% local participants agreed on income growth, but the degree of economic benefit distribution differs and the satisfaction level ranges. The higher earners show more satisfaction than low earners, and in most cases higher earners operate their own shops and other small businesses. The low income earners are single mothers, elderly, less educated and non-business owning villagers who are hired by the business owners.

The table 4.1 shows, the expansion of health care facilities, growth of women's employment, and rise of school enrollment. All of these positive signs are connected to the tourism sector and rise in income level. The health care facility was enhanced to provide medical care for the tourists. Although the health care facility is built for the tourists, the villagers still can visit and receive basic care and this is indicated by 88% of participants who agreed in general that there is a positive change in health care facilities. Women's employment was non-existent in the traditional fishing community, but the tourism sector has offered local women the chance to leave home and earn income by themselves. This is verified by the fact that 96% participants either strongly agreed or agreed to positive change in women's employment. As the household incomes rose parents are sending children to the school, thus school enrollment has risen considerably. The combined percentage of strongly agree and agree on the question regarding rise in school enrollment was 92%. This data reveals that the vast majority of the participants agree on the rise of children's school enrollment.

Even though there are favorable effects of tourism development, the research indicates problematic issues growing out of its erratic growth and mismanagement. The Perhentian Islands' tourist and land-based construction expansions are not systemically organized, thus the unorganized growth of these two factors are closing on the carrying capacity of the local ecosystem.

The establishment of marine protected area on Perhentian Islands had a number of optimistic intentions. The MPA aimed to protect marine organisms and ecosystem biodiversity. MPA in the Perhentian Islands was established to preserve the ecosystem, at the same time to

promote local and international tourism. The Department of Marine Park's role included not only the preservations and supervision of marine ecosystem but also to serve marine park visitors and local communities (Yacob et al. 2012).

The MPA was established to protect the environment and at the same time to offer visitors the opportunity to enjoy the nature. Nevertheless, the natural beauty of the islands and the surrounding environmental quality has been degrading, due to the increasing tourists, and tourism related developments. The fish stock surrounding the islands is decreasing despite the fishing ban in 2 nautical miles from the shore (Muhibudin and Badaruddin. 2014). When MPA was established, the local fishers were not consulted nor invited to the policy-making dialogue. Furthermore local fishers' traditional lifestyle has changed, damaging traditional culture and income earning potential (Islam et al. 2013). The fishing activity goes on at night time, in fear of confiscation of their gears and fishing equipment. Although MPA is efficient in confiscating local fishers' gears, it is not very effective against outside fishers and trawl fishers who catch fish in large quantities. The reason for the ineffectiveness is due to the outside fishers' having faster boats, making them capable of escaping faster. In effect, the fishing ban only punishes local fishers, while leaving out outside fishers. The respondents were divided on the decrease of fish stock in table 4.1, by answering 48% in agreement and 28% in disagreement. The detail lies in the respondents' knowledge on fishery. Most of the boat drivers and former fishers agreed to the decline of fish stocks, while those who answered there is no decrease in fish stock work in the business sector.

The coral reef health has been degrading until 2010 after which the MPA management initiated rehabilitation programs. The attention on the coral reef from MPA management could be related to the fact that most of the tourists visiting to snorkel and dive want to see fresh and healthy coral reef. This is explained by the participants' responses in table 4.1, 56% who agreed and 32% disagreed to question on decrease in coral reef health. The majority of participants i.e. 56% agreed that coral reef health has deteriorated.

For the turtle population change, the majority of the participants, i.e. 76% agreed that turtle sighting is reduced considerably in table 4.1. The reason for the decline has been attributed to the lack of available beach space to lay eggs. Another reason for decline could be that turtles are eating plastic because plastic garbage looks similar to jellyfish, which is turtle's favorite food.

The rest of the participants answered neither agree nor disagree and disagree to the turtle population change, since there is no concrete evidence of turtles dying. The fact that turtles visit Perhentian Islands once a year to lay eggs makes it harder to know the exact number of turtles. Moreover some respondents mentioned that the possibility of turtles going to other places to lay eggs.

The water quality surrounding the shore area has been changing, due to the tourism activities and waste water discharge. The water quality was a debated topic for the villagers because in a way villagers were partly responsible for the pollution and in table 4.1, 52% participants agreed that water quality decreased. One of the reasons of water pollution is the absence of effective water treatment infrastructure on the islands. Figure 4.7 shows how waste water is directly released to the sea through the beach shore. The chalets and other business organizations surrounding the islands follow a similar way of discharging waste water. The beach area is a highly valuable attraction for the tourists and a crucial place for the villagers, but it has been degrading by excessive levels of garbage accumulation. With the introduction of tourism development and increased income, the volume of biological and physical trash soared in the islands. This condition is clearly expressed by the 92% respondents who are agreeing that beach cleanliness has worsened in table 4.1.

Along with environmental degradation in the Perhentian Islands, the traditional culture is changing. Fishing was a main source of sustenance, income and an identity forming activity, but the MPA management's decision to ban fishing in 2 nautical miles struck a blow to the traditional way of life. To preserve the culture and earn income from fishing, the local fishers are forced to fish at night time. This type of forced management upon villagers impacts their emotional well-being and self-worth. Another example of social change is the open alcohol sale. Alcohol sale and consumption are banned in predominantly Malay ethnic places. However, recently the open bar which serves various alcohol products started operating to serve the tourists in figure 4.12. This progression of change designed to attract more tourists has an influence on villagers who work in the tourism sector. Alcohol drinking is a forbidden and punishable offence according to Sharia law in Malaysia (Latiff 2017). This is an example of cultural change and a progression that could cause a conflict between tourism sector and Sharia court in the future.

The ecological balance and the natural beauty that tourists desire to see in Perhentian Islands are in danger of being transformed. The financially motivated changes and business operators benefitting from the tourism development are transforming the islands' physical characteristics. The clear example of this type of concrete changes can be seen in figure 4.2 and 4.9. These constructions are erected directly on the beach and shore areas. The unrestricted construction boom on the islands is intensifying each year. The respondents have been identified in figure 4.8 the rate of land-based development. Out of all the constructions, an existing 5% was built from 1980 to 1990, 10% from 1990 to 2000, 30% from 2000 to 2010, and 55% from 2010 to 2017. The islands' ecological carrying capacity threshold limit could be reached in the near future, if the rate of development continues unchecked. Reaching a carrying capacity limit would cause social-ecological deterioration.

5.2.2 Power Dynamics and Equity Issues in Perhentian Islands

The findings in this section indicate that there are different stakeholders in the Perhentian Islands. The stakeholders in Perhentian Islands are analyzed through a power cube framework, to understand their differences in power. Understanding stakeholders' power and comparative differences could be useful in improving SERS governance mechanism. Moreover conducting power dynamics analysis can be helpful in understanding existing power holding stakeholders and their participation in governance. Power dynamics analysis shows stakeholder groups' advantages and disadvantages in context of tourism development in Perhentian Islands. Analyzing the power dynamics of stakeholders in Perhentian Islands is relevant in this research because the power differences can be related to their ability to participate in governance and management activities. In addition power dynamics between stakeholder groups can be connected to their ability to receive benefits from ongoing social-ecological change as shown in table 4.4.

Although power dynamics analysis of stakeholders provides useful data to better understand ongoing social-ecological rapid change studying relevant institutions and regulations provide extensive and detailed additional information. To have a complex understanding of ongoing social-ecological rapid change, the power dynamics analysis of institutional variables such as MPA management is useful. MPA is an example of federal government institution that is

managed from Kuala Lumpur. Moreover one of the governance issues voiced by research participants is the top down vertical governance structure and low-level stakeholders' inability to affect decisions made in higher level institutions. Local level stakeholders in Perhentian Islands experience difficulty when they try to participate or voice their opinions to influence decisions and policies made in federal government institutions such as MPA. The lack of response to the villagers' needs and problems from national level policy making institutions such as MPA in table 4.5 creates feeling of distrust among villagers. Villagers' distrust to some of the MPA management activities hinder efficient co-operation between stakeholders. Inefficient co-operation between stakeholders can be a driving factor leading to SERS because it restrains various groups and institutions' capability to work together and achieve desired results. Fostering efficient co-operation between stakeholders and institutions in different levels possessing the varying degrees of power is a crucial step in order to reduce the negative impacts of social-ecological change in Perhentian Islands.

This section answers objective 2 of the research and show power dynamics that contribute to and result from the rapid social-ecological change through power cube framework. This analysis recognizes the equity concerns inherent in the ongoing rapid social-ecological change by studying power dynamics. The power cube framework is used in this research to aid the analyses of the second objective because it provides 3 dimensional power dynamics review of the stakeholders. The 3 dimensions of power cube are form, space and place of power (Gaventa. 2005). These dimensions are further divided to create a detailed picture of the power holders. To understand the power dynamics, various power holding social groups are analyzed through power cube framework. Moreover, to have in-depth understanding of ongoing rapid social-ecological change, national and local regulations related to the tourism sector development in Perhentian Islands are also analyzed through the power cube framework. The power cube framework analysis presents demographic variables in tables 4.4 and institutional variables in table 4.5. The data in these tables analyze and interpret the form, space and level dimensions of the power holders.

The Malaysian economy consists of multi-sector components, and among the largest sectors are natural resource exports such as rubber, tin and oil. There are also successful progresses in the service and tourism sectors. The natural resource export industry was established in the pre-independence period, when the colonial system was active. After Malaysia

became an independent nation, the economy was still dependent on the natural resource exports. Economic development plans in table 3.1 show Malaysian 5 year plans. The New Economic Policy (NEP) from 1971 to 1990 and the National Development Policy (NDP) from 1991 to 2000 focused principally on economic expansion, and socio-economic restructuring to reduce Malay and Chinese ethnic groups' disparity (Torii 1997). These plans had placed heavy emphasis on the economic development along with wealth sharing initiatives between the ethnic groups (Sundaram 1989). This tendency was slowly changed and other priorities were added in the National Vision Policy (NVP) from 2001 to 2020. Nevertheless, the ethnically based economic patronage system's change has been slow, with little visible alterations (Whah and Guan. 2015). The national economic plans have a visible form of power to move Malaysia's economic progress forward. Economic plans form in a partially closed space in table 4.5. In other words it affects Perhentian Islands' villagers but does not directly ask or include them in the policy-making stage. These economic plans are becoming more inclusive but they still have the tendency to extend ethnic Malay or bumiputra economic share, while showing less support to the other ethnic groups such as Chinese and Indians (Whah and Guan. 2015). The affirmative action policies favoring bumiputra function in a partially closed space in table 4.5, in policy making levels of government. This economic equity plan among ethnic groups has achieved some success, raising middle class income level and the number of bumiputra wealthy people, but has failed to reach complete equity between all ethnic groups (Whah and Guan. 2015). The Perhentian Islands' villagers were not exempt from the economic progress. Moreover, tourism sector economic development has reached Perhentian Islands as illustrated on figure 4.8, since the 1980s, thus providing villagers with economic benefits. The figure 4.8 shows land-based development on the islands, in other words it shows the increasing amount of investment in the form of construction. The village people in Perhentian Islands are all ethnically Malay people (Islam et al. 2014b). This is an important factor because one of the economic plans' main targets was to improve ethnically Malay people's economic condition (Sundaram 1989).

The Perhentian Islands have established MPA and attracts thousands of foreign and domestic tourists. At the national level, tourists visiting Malaysian marine parks have been growing as the overall Malaysian tourism sector has been growing over the last few decades. In 2012, 626,605 domestic and international tourists visited Malaysian marine parks (Arabimary et al. 2013). The MPA management rules and Terengganu state regulations work hand in hand in

establishing tourism sector in the Perhentian Islands, in table 4.5. The governance mechanisms of these two institutions are instrumental because MPA is under federal ministry managing the coastal water beyond the shore, while the Terengganu state manages the coast and land area on the islands. These government institutions exercise a visible form of power in table 4.5 because the activities conducted by the government are visible to the public. Initially the government created these organizational structures to do certain functions such as managing marine parks, so it operates in a created space in table 4.5. Moreover, it also functions in a partially closed space because government institutions follow legal regulations that allow certain officials to perform decision making tasks in table 4.5. The formation of partially closed and created space is connected to the predominantly vertically structured Malaysian government institutional system. These institutions follow the orders from the top, but are rarely interested in suggestions and requests coming from the bottom levels. The local villagers have said government does not listen to their demands and requests. Although combined government effort to support the tourism sector has benefitted local villagers, there are social and ecological issues mentioned in table 4.1. These problems are mainly associated with the growth of the tourism sector and fisheries regulations. Many participants expressed issues related to pollution created by the chalets, restaurants and tourists.

The tourism sector offers economic opportunity to the villagers but it also causes change in cultural values. Historically, since colonial times, Islamic religion has been part of the tradition at the state level, where various kingdoms held power, while foreign rulers dominated national level regulations. This tradition has continued until today in some ways. States have religious courts upholding the religious Sharia legal system in the fields of family matter and Islamic values. The religious identity influences people on cultural level in invisible form as shown in table 4.5. Furthermore, religious regulations are enforced through Sharia court in partially closed space, since only Imams or Islamic religious leaders have a voice in Sharia law interpretations in table 4.5. Tourism development is altering the cultural norms in Perhentian Islands, and an example can be seen in figure 4.11. This figure shows villagers' dress code regulation and dissatisfaction with the beach clothing worn by the foreign tourists. The standard western style beach clothing differs from the traditional dress and opposes religious guidelines. Traditional Malaysian women wear Hijab, a veil in public places. Another cultural change is alcohol consumption, which is illegal in Sharia. The open bar was introduced to meet tourists demand in

figure 4.12. Operating an open bar provides an option to buy alcohol for the villagers. The loss of religious and cultural regulations in the islands offers additional freedom, while it has led to the loss of traditional values. The fact is that, massive changes in traditional value are happening in Perhentian Islands, at the same time, it is difficult to weigh or calculate cultural benefit and loss. On one hand deterioration of traditional value might lead to a negative outcome, on the other hand local individuals are presented with more freedom of choice and have to make personal decisions when buying alcohol.

The power holding groups are identified subjectively by the village participants in Perhentian Islands during the survey and focus group discussion processes. The distinctions attributed to the groups are not meant to discredit or stigmatize specific people. The power characterizations particular to the groups are based on research participants' perspectives. The five distinctive groupings, namely Perhentian Islands' villagers, mainland ethnics Malays, mainland ethnic Chinese, title holders, and foreign workers are recognized in table 4.4. These five stakeholder groups are involved in the tourism sector in varying degrees. The tourism sector development has been identified as a main driving factor behind social-ecological rapid change in the Perhentian Islands in figure 4.1.

The Perhentian Islands' village people are the only group native to the islands among the five groups. The rest are from the mainland Malaysia or foreign countries. The villagers belonged primarily to a fishing dependent society before tourism development. Fishing brought income by selling fish in the mainland market and it was the main source of subsistence. Currently, even though fishing is prohibited in the two nautical miles no-take zone, de facto fishing continues. Fishing pattern in the rainy season and in non-rainy season are shown in the table 4.3. Fishing pattern in the table indicates a comparison of fishing related changes between rainy and non-rainy seasons. The tourism businesses operate during non-rainy season and close once the rainy season starts. For this reason, fishing becomes only source of income during rainy-season. Out of all participants 84% strongly agreed that fishing activity resumes during the rainy-season. Moreover, 52% of participants strongly agreed that fishing continues in non-rainy season denoting that the villagers fish less in non-rainy season. During non-rainy season tourism related income assists villagers' livelihood therefore reducing the need to fish. However, outside and trawl fishers operate in non-rainy season around the islands, putting stress on the fish stock.

As of September 2017, the local villagers were transforming their lifestyle and participating in the development, business and tourism activities. The villagers' lifestyle change from primarily fishing to working in tourism sector has social-ecological impacts. Local villagers' participation in the tourism sector and business activities is presented in table 4.3. According to the responses 96% agreed that local people are participating in the tourism sector activities that are leading to SERS. The villagers in Perhentian Islands have input in the ongoing activities leading to SERS because they obtain benefit by working in the tourism sector, at the same time they receive negative impact from it. The villagers will most likely stay on the islands, despite SERS outcomes because islands are their home. However all other groups came to the islands to profit from the tourism sector and most likely will leave once the environmental condition degenerates. The power cube framework analysis of villagers as a stakeholder group is described in table 4.4. This group is winning from the ongoing activities that are leading to SERS and growth of tourism sector because their income is rising. At the same time, they are losing from the loss of culture, environmental degradation and the next generations' prospective well-being. Examining characteristics of villagers' power through power cube framework shows certain distinctions. This group' power is effective mostly in the local level in an invited space in visible form in table 4.4. At state level, village chief and other leaders have minor influence, nevertheless Perhentian Islands' villagers does not exercise influence at the national level and this fact makes them less influential than other groups. Not having national level exposure has disadvantages in raising funds to compete with larger companies investing in the islands and obtaining business licenses. Having primarily local level understanding of the tourism businesses could be a disadvantage for the villagers when competing against larger companies investing in the islands.

Malaysia has a number of federal and state level titles bestowed upon people who have distinguished achievements. Usually title holders are distinguished individuals, having excelled in a profession, or achieved an extraordinary accomplishment. In order to grant a title the federal King or one of the state Kings has to approve (Ali 2013). Furthermore, title holders can be from any ethnic background such as Malay, Indian or Chinese. The title holders have visible and partially invisible form of powers in table 4.4. Partially invisible form of power comes from culturally accepted norms to treat these people with honor and privilege. The social privilege may extend to the business dealing and possibly provide an advantage. Title holders operate at

national, state and local levels because these titles are respected throughout the country. This advantage of the title holders can be used in tourism business sector thus making them winners from the tourism sector growth in the Perhentian Islands.

Identity of a person plays a substantial role in Malaysian society, and the institutional preferences treating people from varying ethnicities differently may cause unequal condition (Chin 2015). The ethnically Malay people follow Muslim religion and hold most of the government positions. One of the minority groups, ethnically Chinese follow primarily Buddhist faith and have influence in finance and business sectors. The Chinese ethnic people live and run businesses mostly in large cities. Thus this group is active at the national and local levels in table 4.4. The ethnic Chinese group utilizes invited and partially closed spaces of power in table 4.4. The reason for working in the partially closed space is due to the social prejudice against ethnic Chinese people. This institutionalized preferential condition may influence their decision to work with other ethnically Chinese people. Therefore, this ethnic division could influence their decision to do business with other Chinese people, which lead to have a partially hidden form of power in table 4.4. On the other hand, ethnic Malay investors in the islands operate forthright in visible form and speak openly about their involvement. The mainland Malay group has outreach in all three levels - national, state and local in table 4.4. Despite the contrasts, these two groups have a similarity. They are both profiting from the tourism sector development and can be called winners in table 4.4.

The least influential group that is benefitting from the tourism sector in the Perhentian Islands is foreign workers. These people come mostly from countries such as Indonesia, Bangladesh, Nepal, Philippines and other. The foreign workers receive less salary than local population and in large work in the construction and service sectors. Almost all the constructions are built by the foreign workers. Service job opportunities in the chalets, shops and restaurants are held by this group. Foreign workers have visible form of power in invited space, in table 4.4. Foreign workers have visible form of power because they look for works openly and find jobs in various tourism sector positions. They come from their respective nations to work in Malaysia; hence this group possesses the least amount of power.

5.2.3 Adaptive Co-management as a Component of SERS Governance

The findings in this section demonstrate that the research participants want to make changes in the existing MPA management mechanism. MPA management is understood as an institutional variable and used as an example focal point to show participants' opinions of existing management mechanism because most of the villagers knew about MPA management. Using a focal point such as MPA management to understand participants' perceptions of governance and management was useful because villagers had experience and know-how of MPA management's activities. The MPA management was chosen as an example to understand villagers' perception of existing management and governance mechanism relevant to social-ecological change in Perhentian Islands because villagers felt knowledgeable and comfortable to discuss about it in detail. Furthermore presence and active engagement of MPA management can be seen on islands while other government agencies and organizations' activities are less apparent. From local villagers perspective MPA management is understood as an influential governing body that has power to affect day-to-day activities of participants. The discussion and inquiry about what participants think about MPA management is relevant in this research because it shows overall participants' opinions regarding existing governance and management mechanism. Moreover, participants were able to provide ideas to improve existing governance and management mechanism because they were knowledgeable about the existing problems related to management activities. The provided ideas regarding MPA management's improvement by the participants could be used as input into SERS governance because the villagers in Perhentian Islands are experiencing social-ecological rapid change in their lives and have a practical understanding about it.

This section answers objective 3 of the research and examines governance implications for social-ecological rapid change in the study site and suggests ways to strengthen it by applying adaptive co-management as a governance component. To minimize the negative outcomes of SERS the governance and management methods have to address ongoing activities that are causing those issues. To address the existing issues the governance and management methods have to be innovative and look at the problems with fresh eyes. The importance of having a fresh perspective when addressing issues related to governance and management becomes noticeable when an existing governance mechanism shows inefficient results in handling practical challenges. This means updating existing governance and management mechanism is an important step to deal with new challenges. The effectiveness of various forms of management

mechanism geared towards managing people and society at large may depend on how it is implemented at the grass root level. Understanding power dynamics might be useful to ensure the governance and management's implementation because it gives an additional insight to the targeted people and groups. Inclusion of power dynamics principles in adaptive co-management processes could be a useful idea in managing SERS, because power dynamics can be used to provide additional information regarding social driving factors of rapid change and stakeholders. Power dynamics analysis in Perhentian Islands showed that higher and national level power holders benefit more than lower and local level power holders. This type of vertical power distribution could be considered one of the driving factors leading to inequality between stakeholders. This kind of unequal power distribution creates an atmosphere of distrust between stakeholders such as villagers on lower stratum and policy makers and investors in Kuala Lumpur on higher stratum. The governance and management mechanism showing lack of trust between stakeholders might be ineffective to deal with challenges such as social-ecological change. For this reason ineffective governance mechanism can be considered one of the driving factors leading to various problems in Perhentian Islands.

In order to understand the existing management in Perhentian Islands, the research questions were focused on MPA management as a focal point. The MPA management has been implemented since the founding of protected area on Perhentian Islands. These regulations were assessed by the local Perhentian Islands' participants in table 4.6. These are research participants' personal opinions or assessments of the contemporary state of management that has been analyzed in relation to the changes happening on the islands. As of September 2017, the villagers raised issues with respect to the ways in which MPA management handles problems and the issues are shown in table 4.6. The degree of understanding MPA rules among villagers was extremely high, 96% of participants agreed that they understand MPA rules in table 4.6. From here it is evident that the villagers know MPA management's rules. The degree of information distribution regarding MPA management received slightly lower percentage, 72% of participants agreed that they receive sufficient information about MPA management in table 4.6. In this context, information sufficiency is understood as an amount of information being distributed to the villagers regarding day to day management procedures. This evidence could be connected to the fact that there is no medium of information such as a newspaper in Perhentian Islands to inform the villagers regarding MPA management.

The next step of assessment was to figure out the effectiveness of MPA management in table 4.6. The number of participants disagreeing with the effectiveness of MPA management's rule enforcement was quite high 44%, while 32% strongly agreed and 24% agreed to the rule enforcement effectiveness in table 4.6. Almost half, 44% of the participants were dissatisfied with MPA management's effectiveness in enforcing the rules and manage the existing problems. This fact raises a concern regarding mismanagement and potential ways of improvement. Many boaters and fishers were dissatisfied with the effectiveness of rule enforcement because they thought outside fishers were able to fish using faster boats. On this topic participant 128 said "When the ban started, it was unfair for the local people because they could not fish anymore. Most of the fish stay in the marine park. When the outside fishers use trawl net to fish in the marine park territory, the marine park department doesn't take action. Trawl net fisher boats move faster, but local fishing methods take longer time to catch fish".

The following question was directed at measuring MPA management's funding and manpower availability in table 4.6. The respondents were divided, 48% strongly agreed and 20% agreed that MPA management has sufficient funding and manpower. On the other hand, 16% neither agreed nor disagreed which means they were not sure what to answer. The remaining group of respondents 16% did not think the management possessed sufficient funding and manpower. The majority of participants, in other words 68% thought MPA has adequate means to accomplish the job, but was not able to perform the tasks.

One of the indicators measuring effectiveness of MPA management in practice is the number of people following the rules and regulations. The next question was focused on understanding how many people were following the rules and regulations. A majority of the participants 84% agreed to the existence of MPA rule breakers, thus proving that respect for MPA management is low. The reason for the lack of respect for the MPA management rules could be related to the limited participation of villagers in MPA management. The combined percentage of respondents who strongly disagreed and disagreed to the question addressing local people's participation in MPA management was 64% in table 4.6. This means the majority of the villagers do not participate and contribute to the MPA management, thus don't think they are obligated to follow the rules.

After evaluation of the existing MPA management, local villagers provided their views on improving it. The responses to the question on importance of the villagers' participation in MPA management were 96% in agreement, in table 4.7. This is a major sentiment among the people, a desire to join the MPA management. For the villagers' willingness to participate in the MPA decision-making was 88% in agreement. Participation in the management decision-making requires an extensive involvement and knowledge. Thus, the willingness to participate in the MPA decision-making was lower in percentage than the previous question.

The local villagers have identified several stakeholder groups such as villagers, mainland ethnic Malays, mainland ethnic Chinese, title holders and foreign workers. The importance of cooperation between the stakeholders was highlighted and 96% of the respondents supported stakeholder collaboration in table 4.7. The stakeholders trusting each other and strengthening formal and informal relationships are emphasized. Respondents have agreed 100% to the importance of stakeholders learning from each other. The idea of learning from the previously made mistakes and successes of other stakeholders was supported by all the participants. This was one of the instances when all the participants unanimously agreed on a question. The responses on importance of the stakeholders' cooperation in improving MPA management were divided. More than half, 64% agreed stakeholders' cooperation is important and 32% disagreed in table 4.7. The lack of trust towards the current MPA management was the reason for 32% participants responding in disagreement. This response is based on the historical distrust between the groups. Although there were trust issues, the majority of the participants expressed the desire to have improved partnership to overcome the prevailing challenges.

One of the ways of governing SERS could be to support stakeholder collaboration and forming a management mechanism that assists partnership. This reasoning comes from the participants' responses that seek better relationship between stakeholders to improve the existing management in table 4.7. Adaptive co-management approach could be an efficient management method to reduce negative outcomes of SERS, because it carries with itself directives that support stakeholder partnerships and knowledge sharing. This research has recognized that the local villagers have minimal voice and power in the decision making processes. The power cube framework can be used to measure stakeholder groups' scope of collaboration and presence in the adaptive co-management. In the national level MPA regulation and the national development plans can include various stakeholders' recommendations. Similarly, Terengganu state

regulations and religious rules can include adjustments based on stakeholder contribution to govern SERS systematically. The adaptive co-management principles include elements such as stakeholders' learning from each other to adapt fast changing situations (Schultz et al. 2011). The SERS governance framework in figure 2.1 shows the interactions of the relevant concepts. Successful implementation of adaptive co-management relies on the collaboration, and knowledge-sharing between stakeholders. Power holding groups have to share the knowledge with each other and collaborate with the conviction to make adaptive co-management work.

5.2.4 Synthesis

This section combines the main findings of this research and explains the connection between them in context of the comprehensive SERS governance framework in figure 5.1. The first objective of this research is to identify social-ecological rapid change in the study site. The findings answering to the first objective of this research indicate that the social-ecological rapid change on Perhentian Islands has a potential to become SERS. The characteristics of social-ecological rapid change evidenced in the findings correspond to the some of the definitions of SERS. SERS may impact ecosystem services and human well-being by affecting social-ecological factors (Nayak and Armitage. 2018). The research results in chapter 4 and discussion in chapter 5 indicate the existence of an ongoing activities leading to SERS in Perhentian Islands. RS is described as a rapid and long-term change that can irreversible impact social-ecological dimensions (Biggs et al. 2009). SERS can interfere and show impact on human well-being and ecosystem services (Nayak and Armitage. 2018). The main driving factor behind social-ecological rapid change in Perhentian Islands is identified as activities related to the tourism business. Moreover, this potential SERS case's major social-ecological impacts are presented in table 4.1 and a proximate timeframe of change is shown in figure 4.8.

The second objective of this research is to employ power cube framework that is presented in chapter 2 to analyze power dynamics and equity issues of the relevant stakeholders in context of rapid social-ecological change. The power cube is a theoretical framework that is used for analyzing and understanding what the power is and how it operates (Gaventa. 2005). The findings show the existence of power dynamics' and issues between stakeholders in table 4.4. The findings show stakeholders participate in the tourism sector development activities in

different degrees according to their capacity. The power cube framework is composed of dimensions indicating spaces, levels and forms of power (Njaya et al. 2012). Then these three dimensions of power are further categorized providing greater details (Gaventa. 2003). This research tool was used to inspect ongoing activities leading to SERS in Perhentian Islands because it provides a detailed picture of the existing power dynamics. The third objective aimed to grasp villagers' opinions about existing management mechanism and ways to improve it. In order to achieve this objective, MPA management was used as a focal point because villagers had sufficient knowledge regarding MPA and were able to share it. The findings showed that villagers highly regard and believe in knowledge sharing among stakeholders. Participants believed stakeholder participation activities can improve the existing management mechanism in table 4.7. Adaptive co-management approach includes these management attributes. These findings suggest adaptive co-management has the potential to be a SERS governance component. SERS governance framework in figure 5.1 shows dynamic linkages between SERS governance components such as power cube framework and adaptive co-management.
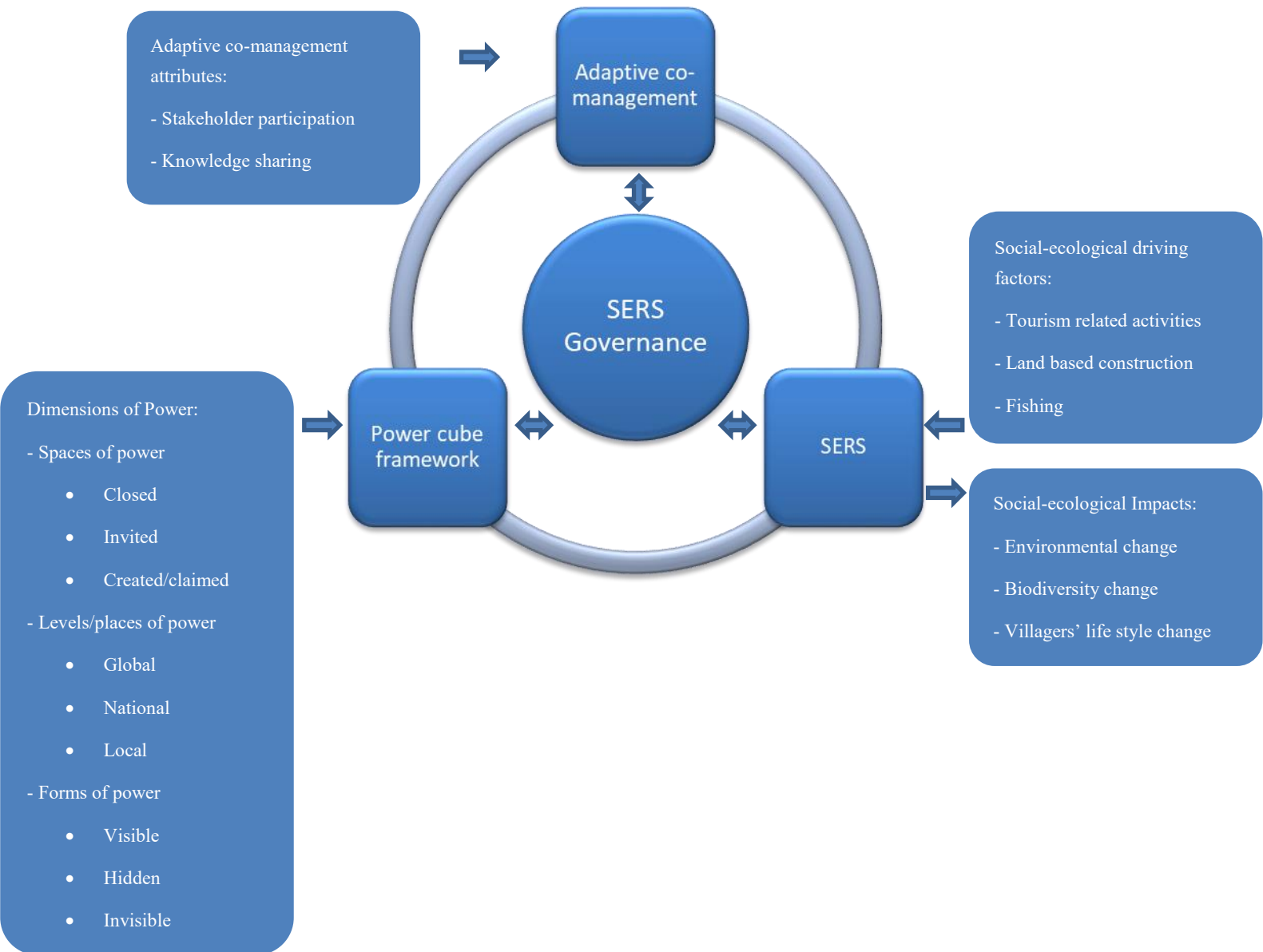
Figure 5.1 – This comprehensive SERS governance framework represents an interconnected design with parts such as: SERS, power cube framework and adaptive co-management as a component of SERS governance. These parts are supplemented with additional components such as: social-ecological driving factors, social-ecological impacts, dimensions of power, and adaptive co-management attributes. The connections between the concepts depict an inclusive and reciprocal relationship between the corresponding concepts.

CHAPTER 6

Conclusion

6.1 Overview

To conclude, RS has certain defined characteristics and happens when an external perturbation or incremental accumulation of driving forces reaching bifurcation level, thus causing the existing population to cross the threshold level (Scheffer et al. 2003). The social-ecological stable states remain within a certain limit with threshold level separating stable states but driving factors can cause RS (Scheffer and Carpenter. 2003). Driving factors leading to RS need to be given attention in order to recognize RS which may have harmful impacts. There are growing confirmations regarding human interferences causing ecological imbalance that may affect social systems (Hughes et al. 2013). To have a comprehensive understanding of interconnected social-ecological factors related to RS, SERS view can be used (Nayak et al. 2016). Acknowledging social-ecological dimensions' interconnectedness when studying RS is important because RS may impact human wellbeing as well as ecosystem (Nayak and Armitage. 2018).

This research focuses on factors and possible ways to reduce negative social-ecological impacts related to activities leading to SERS in Perhentian Islands. The tourism sector activities in Perhentian Islands were identified as a main driving factor behind this potential SERS case. As the development of the tourism business keeps expanding around the world, the constant expansion is becoming an accepted standard business practice. Although business expansion is a positive sign, it is important to understand the social-ecological risks connected to development practices. The development activities result in GDP growth for the economy and have a justifiable support from any government. The tourism sector's endorsement of tourism-related infrastructures in Perhentian Islands is growing rapidly. The economic benefits related to this rapid development influence different levels of government, companies, and local inhabitants of Perhentian Islands to continually build facilities in order meet ever increasing tourist demands. This trend has been constantly intensifying over 30 years in Perhentian Islands. The rate of development has intensified in last 2 to 3 years causing social-ecological rapid change in

Perhentian Islands. The potential risks of this phenomenon can be deterioration of existing social-ecological systems' attributes and crossing over the ecological carrying capacity limit of the islands and surrounding ecosystem. This research has identified ongoing activities leading to SERS in Perhentian Islands and related social-ecological driving factors, power dynamic issues, and related management attributes.

The sequential explanatory mixed method approach was used to explore and answer the goals and objectives of this research. To obtain answers for the research objectives, two phased mixed method approach were used. In the first phase a quantitative survey questionnaire was used to identify major themes and actors associated with the rapid social-ecological change. Then in the second phase, qualitative focus group discussion was used to grasp in-depth aspects of the previously collected data. Moreover, focus group provided data that focused on explaining spatial and temporal progresses of rapid change in Perhentian Islands.

Employing quantitative and qualitative methods were instrumental in identifying and understanding driving factors of social-ecological rapid change and role of power dynamics intrinsic to Perhentian Islands. The power dynamics between stakeholders was analyzed through power cube framework, by figuring out principal social groups, norms and regulations related to social-ecological rapid change. To figure out the existing management structure and villagers' opinions about management issues, MPA management was used as a focal point. The data collected regarding MPA management was analyzed to figure out participants' opinions about ways of improving the existing management mechanism.

6.2 Summary of Findings

The main findings of this research are incorporated in comprehensive SERS governance framework in figure 5.1. The main components of SERS governance framework are formulated during the process of analyzing three research objectives' responses presented in chapter 4 and 5. The research objective findings were instrumental in forming SERS governance framework and its components. The first objective identified potential SERS case in Perhentian Islands and recognized the social-ecological driving factors influencing it. Furthermore the major social-

ecological positive and negative impacts of social-ecological change in Perhentian Islands are identified. The second objective strived to understand power dynamics and equity issues resulting from and contributing to social-ecological change. These power dynamics and equity issues are recognized and analyzed by using power cube framework. The third objective examined existing Perhentian Islands' management mechanism implications by reviewing MPA management as a focal point. By using a focal point management mechanism example, participants were able to assess and suggest ways to improve it. In this process, research participants' opinions on issues regarding MPA management were collected and analyzed. The participants' suggestions to improve MPA management had correlation with the adaptive co-management's essential characteristic values. These values include strengthening stakeholder participation in decision-making processes and extending the knowledge of shared activities between stakeholders. These findings indicate that adaptive co-management can be a component of SERS governance framework as shown in figure 5.1.

The comprehensive SERS governance framework in figure 5.1 consists of three key components forming a conceptual SERS governance mechanism. These three key components are SERS, power cube framework and adaptive co-management. One of the three key components forming framework in figure 5.1 of this research is the identification of potential SERS case in study site. The identification process consists of figuring out social-ecological driving factors and impacts of social-ecological change in Perhentian Islands. Another component is the use of power cube framework in context to better understand power dynamics in a rapidly changing setting. The power dynamics and equity issues which grow out of different stakeholder groups and individuals having different amount of power help to understand the influence of the stakeholders in ongoing social-ecological change. Although there were researches employing power cube framework and SERS, the connection between them have been limited, especially in the Malaysian tourism sector context. By using these two theoretical approaches in cooperation, the process of figuring out the stakeholders connected with social-ecological change driving factors becomes less challenging. This is an example of power and social-ecological change concepts can be used hand in hand to analyze a situation or event. The power cube framework has filled a spot in this research. Power cube framework was instrumental in analyzing stakeholders connected to ongoing potential SERS case in Perhentian

Islands. Without power cube framework a systematical examination of social driving factors would have been troublesome.

The third key component constituting framework in figure 5.1 of this research is the use of adaptive co-management as a component of SERS governance. This suggestion of a potential management approach to be used as a component of SERS governance is based on participants' responses. The research participants have highlighted the importance of all the stakeholders' involvement, collaboration and knowledge sharing in management procedure and decision making. The adaptive co-management theory meets these genuine sentiments and can offer conceptual input to the existing management system in Perhentian Islands. Theoretically SERS may happen in any part of the world, thus this management approach has potential to be implemented not just in Perhentian Islands. Having a management approach to lessen the negative impacts of SERS may reduce social-ecological risks and human suffering on multiple scales and levels. Conceptually linking a management approach and SERS is a step towards finding a practical way to sustainably handle ongoing SERS cases.

6.3 Contribution of the Research

This case study research thesis makes a scholarly contribution that can be useful for the researchers and professionals working in the related areas. The first empirical contribution to research literature is the expansion of the SERS field study knowledge. By studying rapid social-ecological change, SERS literature broadens because by studying the former, the latter becomes evident. SERS can happen in different parts of the world, in varying circumstances, thus conducting case studies in diverse settings improve the ability to understand and answer questions such as why, when and how it happens. This research is an addition to the existing literatures on SERS. By analyzing the expansion of the tourism sector in Perhentian Islands, Malaysia from SERS perspective, this research reveals the long term risks and benefits of development. Through analyzing the field research data, risks of unchecked development prove to cover both ecological-social dimensions. The ecological risks include destruction of ecological balance, danger to native species, pollution, and health hazards for humans. The social risks encompass the loss and erosion of traditional cultural values and overall change in lifestyle.

The second contribution of this research is the comprehensive SERS governance framework in figure 5.1. This SERS governance framework aims to combine concepts in different fields and builds an interconnected governance mechanism that is efficient and practical. This framework combines concepts such as SERS governance, SERS, power cube framework and adaptive co-management. This SERS governance framework may not be able to correct all the issues connected to SERS, but it is a step towards creating a better governance framework.

The third contribution of this research is for the professionals working in related fields. This research offers a theoretical analysis of potential SERS case in Perhentian Islands. The professionals who are facing social-ecological rapid change situation in Perhentian Islands and practitioners in other locations experiencing similar issues can read this research and analyze the respective situations in a similar way. The risks and rewards of tourism sector in study site have been thoroughly explored from a long term theoretical perspective. These research insights can be useful for the tourism business investors and professionals to measure profitability in long run. Business investors can make better financial decisions if they are able to operate a sustainable business in the long run with a minimal risk. The tourism sector growth in Perhentian Islands relies on the natural pristine charm to attract tourists from all over the world, at the same time unchecked development activities are steadily approaching the ecological carrying capacity limit of the islands.

6.4 Future Research Recommendations

The future researchers interested in studying SERS can use topics analyzed in this thesis. Researchers interested in potential SERS cases and its attributes in various contexts in Malaysia or in any other country may use the similar methods used in this research. This way this thesis supports future researchers and policy makers in understanding the existing potential SERS issues and to systemically address them. In Malaysia, states other than Terengganu are also speedily advocating tourism sector development to grow economically. These states pursuing tourism development may not know the potential risks. Consequently they may unknowingly approach a situation comparable to Perhentian Islands. The nearby nations to Malaysia such as

Indonesia, Vietnam and Thailand are also quickly building up tourism industry to attract international visitors. Future researchers can conduct further study on potential SERS cases in these mentioned countries and compare with Perhentian Islands' case study. One of the ways future researchers can benefit from this research is to use the SERS governance framework in 5.1 in their study. Moreover, this type of in-depth case studies can assist the professionals to employ similar approaches to examine SERS cases and be able to better manage them.

Another idea for further research would be to conduct a similar case study in the same location after ten to twenty years. This way SERS progress can be compared and analyzed in-depth. Doing similar researches in two temporal points will offer an opportunity to provide comparison and SERS progression report. The SERS comparison and progression research will be a useful document for the policy makers to look at and make knowledgeable decision.

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APPENDIX A – ETHICS CLEARANCE FORM

Title: Exploring Social-Ecological Regime Shift and Governance: Coastal-Marine Systems in the Gulf of Thailand, Malaysia
ORE #: 22278
Faculty Supervisor: Prateep Nayak (pnayak@uwaterloo.ca)
Student Investigator: Dulguun Maidar (dmaidar@uwaterloo.ca)

A University of Waterloo Research Ethics Committee is pleased to inform you this study has been given ethics clearance.

A signed copy of the notification of ethics clearance will be sent to the Principal Investigator (or Faculty Supervisor in the case of student research). Ethics approval to start this research is effective as of the date of this email. The above named study is to be conducted in accordance with the submitted application (Form 101/101A) and the most recent approved versions of all supporting materials.

University of Waterloo Research Ethics Committees operate in compliance with the institution's guidelines for research with human participants, the Tri-Council Policy Statement for the Ethical Conduct for Research Involving Humans (TCPS, 2nd edition), Internalization Conference on Harmonization: Good Clinical Practice (ICH-GCP), the Ontario Personal Health Information Protection Act (PHIPA), and the applicable laws and regulations of the province of Ontario. Both Committees are registered with the U.S. Department of Health and Human Services under the Federal Wide Assurance, FWA00021410, and IRB registration number IRB00002419 (Human Research Ethics Committee) and IRB00007409 (Clinical Research Ethics Committee).

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Renewal: Multi-year research must be renewed at least once every 12 months unless a more frequent review has otherwise been specified by the Research Ethics Committee on the signed notification of ethics clearance. Studies will only be renewed if the renewal report is received and approved before the expiry date (Form 105 - https://uwaterloo.ca/research/office-research-ethics/research-human-participants/renewals). Failure to submit renewal reports by the expiry date will result in the investigators being notified ethics clearance has been suspended and Research Finance being notified the ethics clearance is no longer valid.

Modification: Amendments to this study are to be submitted through a modification request (Form 104 - https://uwaterloo.ca/research/office-research-ethics/research-human-participants/modifications) and may only be implemented once the proposed changes have received ethics clearance.

Adverse event: Events that adversely affect a study participant must be reported as soon as possible, but no later than 24 hours following the event, by contacting the Chief Ethics Officer. Submission of an adverse event form (Form 106 - https://uwaterloo.ca/research/office-research-ethics/research-human-participants/report-problems) is to follow the next business day.

Deviation: Unanticipated deviations from the approved study protocol or approved documentation or procedures are to be reported within 7 days of the occurrence using a protocol deviation form (Form 107 - https://uwaterloo.ca/research/office-research-ethics/research-human-participants/report-problems).

Incidental finding: Anticipated or unanticipated incidental findings are to be reported as soon as possible by contacting the Chief Ethics Officer. Submission of the incidental findings form (Form 108 - https://uwaterloo.ca/research/office-research-ethics/research-human-participants/report-problems) is to follow within 3 days of learning of the finding. Participants may not be contacted regarding incidental findings until after approval has been received from a Research Ethics Committee to contact participants to disclose these findings.

Study closure: Report the end of this study using a study closure report (Form 105 - https://uwaterloo.ca/research/office-research-ethics/research-human-participants/renewals).

You are responsible for obtaining any additional institutional approvals that might be required to complete this study.

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Erin Van Der Meulen, M.A.
Research Ethics Advisor
Office of Research Ethics
East Campus 5 (EC5), 3rd Floor
519.888.4567 ext. 37046
ervandermeulen@uwaterloo.ca

APPENDIX B – SURVEY QUESTIONS

(1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree)

Rapid Social-Ecological Change

1. Do you think villagers' income increased?
2. Do you think personal safety situation changed?
3. Is there increase in health care facilities in Perhentian Islands?
4. Is there increase in local children's school enrollment?
5. Is there increase in women's employment?
6. Do you think there is decrease in coral reef health?
7. Do you think there is decrease in fish stock around Perhentian Islands?
8. Do you think there is decrease in turtle population?
9. Do you think new buildings are affecting Marine Park?
10. Do you think the cleanliness of the beach has worsened?
11. Do you think the water quality decreased?
12. What are main factors influencing the change?
    Driving factors: tourism activities, fishing, outside fishers, trawl fishing, land based construction, artificial reefs, other (please specify)

Power Dynamics

13. Do you think villagers participate in tourism activities?
14. Do you think villagers participate in business activities?
15. Who are the main owners of the businesses?
16. Is it easy for villagers to obtain business license?
17. Do you think majority of villagers have houses in Kuala Besut/Terengganu?
18. Do you know villager involved in business activities?

Equity

19. Do you think income of fishers is affected by MPA management rules?
20. Do you think local fishers should be allowed to fish for subsistence?
21. Do you think there is more income coming from tourism activities for the villagers?
22. Do you think local fishers fish during monsoon season?
23. Do you think local fishers fish during non-rainy season?

Governance and Management

24. Do you think villagers understand MPA management rules?
25. Do you think MPA management rules are enforced effectively?
26. Do you think MPA management has adequate funding and personnel?
27. Do you think there are people breaking MPA management rules?
28. Are there any punishments for MPA management's rule breakers?
29. Do you think villagers participate in MPA management's decision making process?
30. Do you think villagers are willing to participate in MPA management's decision making process?

31. Do you think villagers are receiving enough information regarding MPA management?
32. Do you think villagers' participation in MPA management is important?
33. Do you think cooperation between stakeholder groups is important?
34. Do you think stakeholders learning from each other in MPA management are important?
35. Do you think stakeholders' cooperation is important for improving MPA management?

APPENDIX C – FOCUS GROUP GUIDING QUESTIONS

Time Periods

1. In which period tourism infrastructures were built?

1980 – 1990	" "%
1990 – 2000	" "%
2000 – 2010	" "%
2010 – 2017	" "%
Total	"100"%

2. How do you think villagers' employment opportunity changed during these periods?

   1980 – 1990

   1990 – 2000

   2000 – 2010

   2010 – 2017

Social Changes

3. Do you think there is change in villagers' safety when moving around in fishing area during night time?
4. Do you think there is change in village children's school enrollment?
5. Do you think villagers have more friends and relatives in mainland?
6. In which period do you think villagers obtained cell phones and satellites?
7. How did the food habit change?
8. How did the respect for elderly change?

Ecological Changes

9. How did the coral health change?
10. How did the fish stock change?
11. How did the turtle population change?
12. How did the water quality change?
13. What are the main factors influencing the change?
14. Do you think ongoing construction activities can continue on?
15. Do you have suggestions to improve the existing situation?

Power Dynamics

16. What is villagers' involvement in development activities?
17. Who are involved in development activities?

Equity

18. What do you think of fishing ban set by MPA management?
19. Do you think tourism activities improve villagers' livelihood?
20. Do you think villagers are satisfied with income from tourism activities?
21. Are there villagers who are experiencing livelihood difficulties?

If yes, are there any supports for these people?

Governance and Management

22. Do you think villagers are satisfied with MPA management rules?
23. Do you think villagers support MPA management?
24. What government agencies are involved in MPA management?
25. Do you think MPA management is effective in marine resource management?
26. Are there active local institutions involved in marine resource management?
27. Do you think villagers are willing to participate in MPA management?
28. Do you think MPA management will improve if stakeholder groups learn from each other?
29. Do you have suggestions to improve existing MPA management?