MULTI-LEVEL GOVERNANCE IN PRACTICE: INVESTIGATING MANGROVE FOREST GOVERNANCE IN INDONESIA

By

FIRDASARI

A thesis submitted to the University of Birmingham

for the degree of DOCTOR OF PHILOSOPHY

International Development Department

School of Government and Society

College of Social Sciences

University of Birmingham

September 2021

ABSTRACT

Mangrove ecosystems are often associated with complex governance systems, resulting from multi-level governance and their location at the land-sea interface. Multi-level governance implies the involvement of various actors in management at different administrative levels, creating coordination challenges. Whilst it is known that governance of renewable natural resources is often complex, with multiple levels, actors, and interests, less is known about what this means for governing in practice and for the conduct of governance, particularly in terms of accountability, transparency, and legitimacy.

This thesis analyses mangrove governance in Indonesia by drawing on the concept of multi-level governance, mangrove governance, governance principles, decentralisation in natural resources and conflict within natural resource management. In drawing on these areas of literature, the research sought to answer the research question "how does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?".

This research employed a case study design and used qualitative methods to analyse mangrove governance based six sites with mangrove forests in Lampung Province. By interviewing representatives of different stakeholder groups, the research found that mangrove forests in Indonesia are governed through different arrangements, informed by location, history, and context. Whilst government actors are critical to governance arrangements, non-government actors, including non-governmental organisations (NGOs) and a university, fill gaps in government provision and provide consistency in mangrove management. This is in part due to local government having to rely on discrete projects to secure resources for mangrove management and due to inconsistent leadership and prioritisation of mangrove forests.

The research found that multi-level governance creates challenges to accountability, transparency and legitimacy that are exacerbated in the case of mangrove forests by the diversity of actors involved, associated with the land-sea interface and the involvement of non-government actors, filling in gaps in government conduct. Given the limited capacity of government in managing mangrove forests, local government officers utilise informal as well as formal means, drawing on networks of contacts and local norms.

The analysis shows that mangrove governance requires greater dedicated attention, with practice in mangrove governance aligning with dedicated policy and strong coordination mechanisms developed across government sectors involved in mangrove management. By bringing together analytical tools associated with multi-level governance and governance principles, the research contributes to knowledge mangrove governance.

ACKNOWLEDGEMENTS

My first acknowledgement goes to my supervisors, Prof Fiona Nunan and Dr Simon De Lay. Their support and help have been a great source of encouragement. They were always having time to offer advice when needed. The thesis would have not been possible without support and patience of my supervisors.

Secondly, I sincerely thank to LPDP (Indonesia Endowment Fund for Education), Ministry of Finance, Republic Indonesia, for providing me with financial support during my study at University of Birmingham United Kingdom. Also, to University of Lampung which allowed me to dedicate myself fully to the thesis.

My gratitude to Bruce J Emond for his proofreading skills, helped me shape a better thesis.

Lastly, I must also acknowledge my family: mother, late father, brothers and sisters, husband (Kristianto Usman, Ph.D.), son (Nabiel Razzan Rivaldo) and daughter (Scarlett Nafisa Miura), for all the pray, best wishes and support.

Thank you.

TABLE OF CONTENTS

ABSTRACT ii
ACKNOWLEDGEMENTS iii
TABLE OF CONTENTS iv
List of Figures viii
List of Tables ix
CHAPTER 1 ix
INTRODUCTION 1
1.1 Research Problem 1
1.2 Research question and research objectives 7
1.2.1 Research question 7
1.3 Research design, sampling, and methods 7
1.4 Structure of the thesis 9
CHAPTER 2 11
LITERATURE REVIEW 11
2.1 Introduction 11
2.2 Mangrove Governance 11
2.3 Natural Resource Governance 15
2.3.1 Multi-level Governance 16
2.4 Decentralisation of natural resources 21
2.4.1 The role of local government agency 24
2.5 Community-based (mangrove) management 27
2.6 Governance principles in multi-level governance 28
2.6.1 Legitimacy 29
2.6.2 Transparency 32
2.6.3 Accountability 34
2.6.4 Inclusiveness 37
2.6.5 Fairness 38
2.6.6 Integration 39
2.6.7 Capability 40

2.6.8 Adaptability 41
2.7 Conflict within natural resources management 41
2.7.1 Conflict management and resolution 44
2.7.2 Forest related conflict 47
2.8 Conclusion 47
2.9 Analytical framework 49
CHAPTER 3 54
RESEARCH BACKGROUND 54
3.1 Introduction 54
3.2 Mangrove Forest 54
3.2.1 Mangrove forests in Indonesia 55
3.2.2 Mangrove Management in Indonesia 58
3.3 Mangrove in Lampung Province 61
CHAPTER 4 68
RESEARCH METHODOLOGY 68
4.1 Introduction 68
4.2 Research Approach: research paradigm and philosophical 68
4.3 Research design 71
4.3.1 Case study design 71
4.3.2 Multiple case studies 73
4.4 RESEARCH METHODS 74
4.4.1 Quantitative method 74
4.4.2 Qualitative methods 75
4.4.3 Mixed Methods 77
4.4.4 Selection of research methods 78
4.4.5 Sampling 79
4.5 Data Collection 82
4.5.1 Semi-structured interviews 82
4.5.2 Focus Group Discussions 83
4.5.3 Secondary data 84
4.5.4 Participatory Rural Appraisal (PRA) 85
4.5.5 Fieldwork 86
4.6 Data Analysis and Interpretation 89
4.7 Research Ethics 90
4.8 Conclusion 91

CHAPTER 5 92
ARRANGEMENT OF MANGROVE GOVERNANCE 92
5.1 Introduction 92
5.2 Multiplicities of administrative levels 93
5.3 Multiplicities of actors 98
5.3.1 Government actors 98
5.3.2 Non-government actors 106
5.4 Challenge of coordination 113
CHAPTER 6 117
MANGROVE GOVERNANCE IN CONDUCT 117
6.1 Introduction 117
6.2 Legitimacy 117
6.3 Transparency 125
6.4 Accountability 130
6.5 Inclusiveness 134
6.6 Fairness 137
6.7 Integration 139
6.8 Capability 140
6.9 Adaptability 142
Chapter 7 145
Mangrove Governance in Practice 145
7.1 Introduction 145
7.2. Government arrangement: relying on projects for mangrove management 146
7.3 Non-government activity on mangroves 148
7.4 Forest Management Unit in mangrove management practice 153
7.5 Conflicts within mangrove management 156
CHAPTER 8 163
CONCLUSION 163
8.1 Introduction 163
8.2 Summary of findings 163
8.2.1 Mangrove forest governance system 164
8.2.2 The conduct of mangrove governance 170
8.2.3 Mangrove governance in practice. 173
8.2.4 Conflicts within mangrove management 176
8.3 Contribution to knowledge 178

8.4. Future directions 179
8.4 CONCLUSION 180
REFERENCES 182

List of Figures

Figure 1. "Guide for analysing multi-level governance of natural resources". Source: Nunan, 2018:p.162 50
Figure 2. A conceptual framework for analysing multi-level governance of natural resource management. Developed from the "Guide for analysing multi-level governance of natural resources" (Nunan, 2018: p.162). 52

List of Tables

Table 1. Mangrove vegetated and potential area in Indonesia 57
Table 2. Mangrove forests area in Lampung province 62
Table 3. The width and condition of mangrove forests coverage in Lampung Province 62
Table 4. Samples for the research 82

CHAPTER 1

INTRODUCTION

1.1 Research Problem

Mangroves refer to specific vegetation that grows in unique habitats known as swamps, wetlands, or tidal forests (between land and sea) (Duke et al., 2007; Spalding et al., 2010; Mwangi et al., 2017). The ecosystems structurally and physiologically dominate the sheltered intertidal environment of warm temperate oceans in tropical and sub-tropical coastlines and thrive in areas where pure seawater is diluted by high regular rainfall, groundwater flows, rivers, coastal lagoons, and open coastlines (Spalding et al., 2010; Tuyen et. al, 2010). Therefore, they are known to be rich in biodiversity and have high levels of biomass and productivity (Gilman et al., 2008). The important role of mangroves, however, is not limited to the environment but also extends to the local community, as people benefit from the forest's resources in varied ways, such as collecting timber for firewood and food (Armitage, 20202).

Despite their recognized importance in coastal protection, biodiversity, conservation, and carbon sequestration, the cover of mangrove ecosystems in the world continues to decline (Mwangi et al., 2017). The major cause of this decrease in mangrove forest coverage worldwide is anthropogenic, including deforestation, conversion, agriculture, over-extraction, and coastal development (Mwangi et al., 2017).

One of the underlying causes of degradation is the poor performance of mangrove forest governance (Lockwood et al., 2010; Springer, 2016). It has been found that poor performance in governance stems from the complexity of mangrove forests and their governance systems and inadequate resources dedicated to mangrove forest governance. What has been less well researched is how the governance of mangrove forests is undertaken in practice. This is the focus of the research reported on in this thesis, informed by multi-

level governance analysis and analysis of the conduct of governance by analyzing key governing principles, such as legitimacy, transparency, and accountability.

A global review of mangrove management has found that authority over mangroves, both for conservation and management, is mostly vested within state institutions with the main aim being mangrove protection (Mwangi et al., 2017). Mangrove state forests which are owned and managed by the state, in most instances, there are limitations for the local community to access (or no access at all), manage the resource, or withdraw anything from the resources (Sudtongkong and Webb, 2008). It is commonplace in many mangrove-hosting countries that even though the ecosystem can be owned privately, the government prefers to keep it under state management (Berkes et al., 1989; Primavera and Esteban, 2008; Walters et al., 2008).

However, it is argued that mangroves under state-centered management are mostly put under management that involved many sectors (Banjade et al., 2016). This is related to the uniqueness of mangroves that grow between land and sea, requiring management of mangrove forests to be put under several institutions that represent authorities with jurisdiction over the land and over the sea (Berkes, et al., 1989). In addition, in many cases, government control and presence are not effectively implemented or are even lacking altogether. As a result, many mangrove forests in developing countries are facing an array of problems, such as the capacity of government institutions being weak, high demand for social needs (for example, extracting mangroves for livelihoods), as well as corruption in management (Suman, 2019).

Mangrove forest management therefore often ends up in a bureaucratic gap between boundaries where governmental management strategies and legislation may be contradictory or duplicative (Suman, 2019; Fries et al., 2016). Government regulations, laws, and policies implemented in coastal management (including mangroves) are also required for other sectors including fishery, marine, environment, and land use sectors (Friess et al., 2016). Consequently, there is a lack of specific laws and policies for mangroves (Banjade et al., 2017). This situation can lead to overlapping as the different agencies already have their sectors with regulatory authority over mangrove forests (Iftekhar et al., 2008; Islam and Wahab, 2005). For example, this happens in the Philippines where mangroves are under

responsibility of the Bureau of Fisheries and Aquatic Resources part of Department of Environment and Natural Resources (Primavera and Ashton, 2010), and in Cambodia where the government puts mangrove forests management under the Department of Fisheries, while the non-tidal forests are the domain of the Department of Forestry (Torell et al., 2004).

In addition to the status of mangroves as state forests, local people are usually forbidden to collect resources from the forests or benefit, access or manage them (Ribot and Peluso, 2003). They are barred from doing so not only because they have no authority to do so (acknowledged by the government), but also because the government controls the forests. It is a situation that can potentially trigger conflicts between locals and the government, as well as within the community (in simple terms, between those who have exclusive access to the resources and those who have lost access to the resource) (Hoang Hao Tra My and Takeda, 2015). Disputes or conflicts within natural resource management can give different perspective from local community to respond to government arrangement like reforestation (Hue and Scott, 2008).

The involvement of multiple state institutions has caused problems in mangrove management related to overlapping authority and responsibility (Chusak and Vandergeest, 2010; Kusmana, 2014). In many cases, the involvement of several government institutions is not supported by frameworks and mechanisms to guide coordination between state agencies; or when there is any, it is difficult to implement (Banjade et al., 2017). This particularly occurs in countries with decentralization systems because the management of mangroves becomes more challenging due to a decentralization involving transfer of powers from central authorities to lower levels (Larson and Soto, 2008). So, in decentralized systems, the involvement of various actors with different powers or authority in the decision-making process requires processes of accountability both upward and downward in order to make decentralization work effectively (Chusak and Vandergeest, 2010). However, the same perception in terms of power control and access to resources between the local and the global or national context is also required.

In addition, the increasing number of actors as well as interests in mangrove management found at different levels are the leading contributing factors in creating multiplicity in the governance system (Mwangi and Wardel, 2012). Furthermore, the number of actors involved

in governance will create another issue related to the coordination across the multiple parties (Nunan, 2018). In fact, proper coordination is considered one of the key features in management of coastal areas that can be expected to bring better understanding and cooperation between multiple stakeholders, particularly in addressing a wide range of issues in coastal management and development (Thia-Eng, 1993).

Apart from the governance system, the conduct of mangrove governance is also an important aspect to consider. Poteete (2012) and Termeer et al. (2010) argue that the involvement of multiple actors at different levels in a multi-level governance system raises challenges for the conduct of mangrove governance. This is because the diversity and range of actors from different sectors have the potential to muddle the responsibilities among actors (Lockwood et al., 2010; Springer, 2016). For example, this can occur in the decision-making process, sharing information between sectors, and processes of accountabilities. In meeting this challenge, several key components are suggested to influence governance conduct such as accountability, legitimacy, transparency, inclusiveness including representation and participation, integration, fairness, capability, and adaptability (Lockwood et al., 2010). In addition, the implementation of such principles is important to analyze the arrangement and the conduct of the governance (Nunan, 2018).

Indonesia is part of the world trend of declining mangrove areas. It is the country that possesses the largest mangrove forests in the world, with coverage equivalent to up to half of the mangrove trees in Asia or about 20-22 percent of the world total (Giri et al., 2011). Despite their importance, mangrove forests in Indonesia continue to face enormous threats, particularly from economic activities such as timber logging and aquaculture (Banjade et al., 2017). Murdiyarso et al. (2015) estimate that between 1970 and 2001, almost half of the mangrove forests in Indonesia were destroyed due to agricultural and timber logging. In addition, mangrove deforestation in Indonesia has resulted in the loss of carbon dioxide (CO2) of almost 190 million metric tons per year (Murdiyarso et al., 2015). Kusmana (2014) states that currently, only about 30 percent of mangrove forests in Indonesia would earn a "good" rating. Naturally, there is strong global pressure for mangrove management, conservation, and rehabilitation (Mwangi et al., 2017).

The complexities of mangrove governance globally that is described above also affect their management in Indonesia. First, to manage mangroves across Indonesia's coastal landscapes (which are mostly state-owned), the government involves multiple government institutions and puts mangroves under diverse tenure regimes as protected areas, and under joint management with communal and customary arrangements (Mwangi et al., 2017). According to Kusmana (2014), there are at least five government ministries in Indonesia involved in mangrove management. The involvement of the actors is strengthened by the issuance of various laws and policies, so the actors have authority over mangroves and can determine the resource allocation directly or indirectly (Kusmana, 2014; Banjade et al., 2017).

Second, as Indonesia adopted decentralization in its government system from the late 1990s on, there has been transfer of authority from the central government to lower-level government. In addition, local governments at the provincial and district levels have the authority to manage natural resources at provincial and district jurisdictions. This means that more actors are involved at different levels with different laws and policies issued to address their involvement. Moreover, the actors might have their own arrangements, and there might be a process of accountability for actors from lower levels to higher levels. Thus, the mechanism of delegating authority, in which actors are provided with the authority and/ or mandate to manage the mangroves, as well as the process of accountability becomes complex and is therefore important to identify and understand.

Third, regarding coordination, the Indonesian government created the National Strategy for Mangrove Ecosystem Management in 2012 through the issuance of Presidential Regulation 73/2012 which aims to strengthen and enable coordination between multiple government actors' involvement in mangrove management (Banjade et al., 2017). Due to the involvement of various actors, coordination becomes an important aspect to be addressed to avoid the issue of overlapping or duplicating authority/interests in mangrove management. Therefore, the mechanism and issues related to coordination in mangrove governance in Indonesia is important to identify and analyse.

Explanation above emphasis that greater understanding of what this governance is in practice is needed. Mangrove ecosystems are associated with complex governance systems, resulting from the multi-level governance system and its location at the land-sea interface. The

complexity of multi-level governance of renewable natural resources is related to the involvement of multiple actors at different administrative levels, in tandem with multiple interests that create coordination challenges. Less is known about what this means for governing in practice and for the conduct of the governance particularly in term of mangrove governance.

This thesis aims to analyses mangrove governance in Indonesia in terms of the governance system of multiple-levels, strategies, arrangement, and performance of governance. The aims of this study are twofold. The first is to analyze mangrove governance in practice in Indonesia through institutional legal arrangements, particularly at lower levels, that are important to identify and understand how the arrangements function and influence the sustainability of the mangrove ecosystem.

The identification includes various sectoral arrangements through the issuance of laws, policies, and regulations that address mangrove governance and the mechanism of various government authorities that are delegated to implement them. This is important to be able to answer the research question of "How does the multi-level, multi-actor governance landscape affect the practice and performance of mangrove governance in Indonesia?".

The second aim is to contribute to the specific literature reviewed in Chapter 2 by seeking the key important aspects of multi-level governance, mangrove governance, governance principles, and conflict within mangrove management. In addition, this research is important because it addresses the human dimensions of mangrove management in Indonesia amid the imbalance toward research focused on ecological and biophysical dimensions rather than human dimensions. Moreover, Mwangi et al. (2017) acknowledge that analyses related to governance arrangements and their implications for mangrove management (including rehabilitation and restoration) and the use of the resource sustainably are scarce (Mwangi et al., 2017).

1.2 Research question and research objectives

1.2.1 Research question

This research aims to analyze mangrove governance in practice in Indonesia through institutional legal arrangements, particularly at lower levels. It is important to identify and understand how the arrangements function and influence the practice of sustainability of mangrove ecosystem achieved by answering the following research question:

"How does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?"

Addressing the research question is achieved systematically through answering several sub-questions as follows:

(1) How are mangrove forest governance systems arranged in Indonesia?
(2) How is mangrove governance conducted?
(3) How do governance actors practice mangrove management and why?

1.3 Research design, sampling, and methods

This research employed multiple parallel case studies designed for different locations with mangroves that were observed at relatively the same time. The sites were six villages in two regencies in Lampung province are represent the cases related to mangrove governance that the involvement of multi-actors occurring at multiple levels in mangroves influenced the system and the conduct of the governance. The cases in six villages give a detailed description and produce robust results that are necessary to answer the research question. A case study may contain more than one case (multiple case studies) (Yin, 2003). Meanwhile, multiple case studies are associated with several experiments or studies (Baxter and Jack, 2008). Multiple case studies have more advantages than single case studies because multiple case studies include some cases in a study that make the researcher understand cases through similarities as well as the differences between cases (Baxter and Jack, 2008). This is important so the researcher can provide important literature related to the similarities and differences they found and is able to analyze the data within the cases as well as across the cases (Vannoni, 2015; Yin, 2003).

Meanwhile, for methodology, this research utilized qualitative methods. The research begins with a general concept of multi-level governance that includes governance system, the role of multiple actors, and community participation, followed by the concept of governance performance, and mangrove governance in practice. The characteristic of qualitative research in giving in-depth definition and description (Berg and Howard, 2012) is adopted in this research to understand the social phenomena that happen to mangrove ecosystems regarding governance system and performance. So, the qualitative method is utilized to analyze the governance systems, particularly governance in natural resource that relates to mangrove in Indonesia, and how the multi-level, multi-actors governance landscape affects the practice and performance of mangrove governance in Indonesia.

Regarding sampling, this research selects the respondents and locations to be sampled. The locations were in East Lampung District and Pesawaran District in Lampung province. The six villages selected as sample sites were: Srimonosari, Margasari, and Karya Makmur village (East Lampung Regency), and Padang Cermin (Pahawang Island), Gebang village, and Sidodadi village (Pesawaran Regency). All sites were chosen because of these similarities, their mangrove forests, and the governance practiced, as well as differences related to non-government actors' involvement and governance arrangement over the mangrove ecosystems. There are two types of selection of cases in multiple case studies that will determine the result produced. The first is one 'literal replication' that is related to similar cases that will produce similar results, and the second 'theoretical replication', refers to the selected cases which are based on the assumption that those cases will generate contradictory results (Yin, 1984).

Meanwhile, the selected people (respondents) sampled were based on the purposes: provincial and district governance agencies (to examine the governance systems and practices) from multiple institutions related to mangrove management including Forestry office at province levels including Forest Management Unit agency and Watershed Management Centre, Fishery office at the district level, Environment office at province and district levels, local village leader, NGO, and the community involved in mangrove group. All participants are the most active actors in mangrove management.

To collect data, as an example of qualitative research, this research used a semi-structured interview approach. It is deemed fitting to gain in-depth and detailed information regarding governance systems, practices, and actors in managing mangrove ecosystem. Along with semi-structured interviews, focus group discussions and participatory rural appraisal were also applied, particularly to engage with local communities and households as user of the mangrove ecosystem. These approaches allowed the researcher to examine their role in mangrove management and how they benefit from mangrove ecosystem goods and services, as well as observed the condition of mangrove forests and the village where they are located.

1.4 Structure of the thesis

The thesis is structured into eight chapters. The following chapter, Chapter 2, reviews the literature on mangrove governance and identifies key features related to mangrove governance including a general explanation of governance, and the main characteristic of mangrove governance. These include the complexity in mangrove governance, such as multiplicity of levels, to illustrate that mangrove governance occurs at different administrative levels; multiplicity of actors that refers to governance involving es multiple government actors from multiple institutions. There is also the involvement of non-government actors because they have specific roles in mangroves such as facilitating conservation, community empowerment, and community-based management; multiple governance arrangements; and governance systems to explain the complexity of mangrove governance including multi-level governance, network governance, polycentricity, and decentralization. Apart from the complex nature of mangrove governance, the reviews also include challenges found in mangrove governance such as coordination and interaction between and within actors involved, the role of local government, and community participation. In the second part, the chapter reviews governance principles that are utilized to explain governance performance. It is followed by a review of the conflict within natural resources management. At the end of Chapter 2, an analytical framework is developed to help the researcher answer the research objectives.

Chapter 3 provides background information on the current condition of mangroves in Indonesia, with a focus on Lampung province as the case study location. Chapter 4 sets out the research methodology utilized in this research, including a discussion of the research

paradigm, research design, the use of case studies, and data collection chosen, which is qualitative methods through conducting semi-structured interviews, focus group discussions and participatory rural appraisal, data analysis and interpretation, and ethical considerations.

Chapters 5, 6, and 7 are the findings and empirical analysis chapters. Chapter 5 sets out descriptions of mangrove governance based on the case study. Included is how mangrove management is conducted at different administrative levels and involves multiple government actors from different institutions; the involvement of non-government actors based on their roles; as well as the complexity in mangrove governance such as difficulty to do coordination and interaction between actors. Meanwhile, the conduct of mangrove governance is discussed in Chapter 6 using Lockwood's governance principles approach, including legitimacy, accountability, transparency, inclusiveness, fairness, integration, adaptability, and capability. Chapter 7 details mangrove governance in practice, including how activities related to mangrove governance are arranged and implemented, and how the governance actors cope with conflict within mangrove management.

Chapter 8 is a summary of findings and conclusions. The findings include the identification of key important factors of mangrove governance, such as the involvement of multiple actors that occurs at multiple administrative levels, the governance performance, and mangrove governance in practice that including how project on mangrove conflict within natural resources. In this chapter, findings emerging from the case studies are identified and determined for further research ideas and contribution to knowledge.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on mangrove forests and their governance to identify key characteristics and governance approaches that indicate further areas of literature to be reviewed. This review identifies the following areas as fundamental to mangrove governance: the complexity of governance landscapes due to the multiple-use and contexts of mangroves; community-based mangrove management; how the performance and effectiveness of governance can be assessed against governance principles; and, how governance interacts with conflict prevention and response in natural resource settings. In addition, the literature related to the conflict in natural resource governance is important to be reviewed since conflicts or disputes over resource access and use are mediated by and affect governance. The importance of reviewing this area of literature is to enable the researcher to answer the research questions and help develop an analytical framework to guide data collection and analysis.

2.2 Mangrove Governance

This section reviews literature on mangrove governance, including the uniqueness of mangrove ecosystems and characteristics of mangrove management, such as the involvement of various actors and, management at different levels, and state-centered management.

Mangrove forests are known as the only ecosystem situated at the confluence area of the land and the sea in most subtropical and tropical parts of the world (Spalding et al., 2010: Suman, 2019). An estimated 73 species and hybrids can be found in about 123 countries (Spalding et al., 2010). The ecosystem has an array of functions that are essential for the

sustainability of the environment as well as community welfare, such as providing food for marine biota, preventing coastal erosion, acting as a natural barrier against the threat of tidal waves and tsunamis, a waste absorber, and to prevent seawater intrusion (Spalding et al., 2010). Various goods and services provided by mangroves can benefit the public (Clark, 1996). In addition, mangrove ecosystems are also important for people who live in the vicinity because they provide goods that can be used by them, such as timber, fruits, and leaves, and consequently, their development can boost their income (Mahardika et al., 2018).

Although mangrove forests can be owned privately, evident from the existence of private and community-based regimes, in most countries with mangroves, the forests are state-owned lands (Berkes et al., 1989; Clark, 1992:1996; Primavera and Esteban, 2008; Walters et al., 2008). Even with the status of government-owned, in reality, the forests are an open access area with minimal control exercised by the government and therefore vulnerable to overexploitation and conversion (Berkes et al., 1989; Primavera and Esteban, 2008; Walters et al., 2008). This is because in many cases government control and presence are not effectively implemented or even lacking. Many mangrove forests in developing countries face a problematic situation, such as the capacity of government institutions is weak, high demand for social needs (for example, extracting mangroves for livelihoods), as well as corruption in management (Suman, 2019). Thus, management of mangrove ecosystems that falls under government coastal zone management programs requires participation and cooperation of several sectors, including forestry, fishery, and land use agencies (Beatty et al., 2002). In such arrangements, state and regional governments are usually involved in the implementation of the programs (Beatty et al., 2002).

Nevertheless, it can be argued that the involvement of multiple government institutions from different levels (state and regional) in mangrove management can cause complexity derived from various policies and programs implemented in the management (Beatty et al., 2002). This might also create another issue of overlapping authority or ambiguity in mangrove management and influence from the government's administrative and regulatory structure (Nunan, 2018). In addition, natural resource governance increases its complexity by the involvement of additional actors in various ways; these include decentralization of natural resource governance to local authorities, the implementation of various approaches and initiatives, such as participatory through networking and/ or collaborative approaches, and/

or payment for ecosystem services and certification schemes (Nunan, 2018). Furthermore, Nunan (2018) suggests that this situation results in an interactive and multi-tiered governance system that can be described in several ways, namely: multi-level governance, polycentricity, and network governance. The existence of multiple actors interacting at multiple administrative levels and multiple scales comes together in a multi-level governance system (Armitage, 2008; Mwangi and Wardell, 2012).

In many countries with large coverage of mangroves, the government prefers to put mangroves under state authorization and management to maintain fairness and sustainability in the use of ecosystems (Banjade et al., 2017). Once the mangroves are fully managed by the state, the mangroves belong to the government and it restricts access, exploitation, and management by other actors (Sudtongkong and Webb, 2008).

State-centred management of mangrove forests is usually deliberated under management that is suited for many sectors (Banjade et al., 2016). It means that rather than put the focus only on forestry sectors, the regulations, laws, and policies implemented in coastal management are also applied to fishery, marine, environment, and land use sectors (Friess et al., 2016). As a result of this system, the governing system puts many sectors under one regulation or law that usually splits or fragments the authorities into multiple national agencies (Banjade et al., 2017). In addition, several different agencies at different governmental levels have their sectoral regulatory authority over mangrove forests (Iftekhar, 2008; Islam and Wahab, 2005). This has made mangroves fall between this boundary where governmental management strategies and legislation may be contradictory or duplicative (Suman, 2019; Fries et al., 2016). Examples are in the Philippines, where mangroves are under responsibility of the Bureau of Fisheries and Aquatic Resources, part of Department of Environment and Natural Resources (Primavera and Ashton, 2010), and in Cambodia, where the government puts mangrove forests management under the Department of Fisheries, while the non-tidal forests are under the Department of Forestry (Torell et al., 2004).

However, putting the mangrove management only under one department (e.g., forestry of fisheries department) fails to make the management effective because mangrove forests grow in tidal areas that are known as dynamic ecosystems that are difficult to be managed

by single institutions (Lebel, 2012). It is the nature of mangroves to be located at the interface between the land and the sea which is a zone of multiple agency jurisdictions (Suman, 2019). As the management objectives on mangroves are often incompatible, contradictory, fragmented at both sectoral (land and sea), and intergovernmental levels, thus it is suggested to establish institutions that are capable of accommodating the land and sea boundaries in coastal management (Lebel, 2012; Dale et al., 2014; Kairo et al., 2001).

Another concern arises when mangroves are put into governing with many sectors that pertains to the coordination across the multiple stakeholders involved (Nunan, 2018). Banjade et al. (2017) note that the form of the coordination may vary, but mostly it requires government strategy and arrangement. Thia-Eng (1993) argues that coordination as one of the key features in management of coastal areas can be expected to bring better understanding and cooperation between multiple stakeholders, particularly in addressing a wide range of issues in coastal management and development. Furthermore, Thia-Eng (1993) suggests that an appropriate institutional arrangement that is fit for natural resource governance is required to accommodate the coordination processes, and this institution should be involved both at central and local levels to be more effective in achieving integration management.

It can be concluded that due to the uniqueness of mangrove ecosystems that are located in the intertidal area between the land and the sea, the management of mangrove ecosystems requires the involvement of various stakeholders that can represent the particular interests of land and sea boundaries. The involvement of state institutions is important to strengthen and support local institutions, enforce resource use, and act as mediators when there are conflicts related to natural resources. However, the involvement of multiple stakeholders has caused several issues in mangrove management related to coordination and overlapping of authorities. Thus, it is recommended that to achieve sustainability in mangroves, the stakeholders should consider arrangements or systems under natural resource governance management.

2.3 Natural Resource Governance

This section reviews types of governance systems in natural resource management, including mangrove management. Several factors are recognized to influence natural resource governance, including the existence of multiple objectives of natural resource governance, such as ecosystem sustainability and improving the welfare of livelihood, and the type of governance system such as decentralization (Nunan, 2018; Larson and Ribot, 2004). Those objectives can be achieved through various efforts such as mitigation of disaster, forest conservation or protection, arrangement of access to the resource, and benefits derived from the resources (Nunan, 2018). In addition, multiple objectives in natural resource governance are believed to have influenced and characterized the governance of natural resources, as well as led to the forming of an interactive and multi-tiered governance system that can be described in various types of governance, including multi-level governance, network governance and polycentric governance (Nunan, 2018).

In relation to natural resources, governance has been defined as "the norms, institutions, and processes that determine how power and responsibilities over natural resources are exercised, how decisions are taken, and how citizens – including women, men, youth, indigenous peoples and local communities – secure access to, participate in, and are impacted by the management of natural resources" (Campese, 2016: p.7). Governance of natural resources occurs at different levels, including by groups of people within a local area and at sub-national, national, and international levels (Nunan, 2018).

Natural resource governance is known as a complex governance system because it deals with the interaction between species and ecosystem processes and functions as part of its nature, along with the involvement of various actors as part of the social system (Nunan, 2018). In addition, natural resources are particularly vulnerable to changes brought by change, bringing unexpected effects in the process of responding to these changes (Adger et al., 2006). Thus, managing natural resources requires strong commitment and immediate effort, particularly in the governance of natural resources with characteristics that are expected to be capable to manage the complexity of natural resources including all aspects within the resources (Adger et al., 2006).

2.3.1 Multi-level Governance

A major challenge in natural resource governance is often related to recognizing, understanding, and addressing the arrangement of spatial linkage across scales as well as designing and implementing effective governance systems (Berkes, 2008). This section provides an overview of the importance and the arrangement of the multi-level governance concept. As previously explained, a natural resource and its governance are two complex systems: both an individual and an integrated system. Mwangi and Wardel (2012) argue that increasing the range and number of actors as well as interests in governance of natural resources that occur at different levels are the major contributing factors in creating multiplicity in the governance system. Known as "multi-level governance", this highlights the existence of multiple actors that interact at multiple administrative levels and multiple scales (Armitage, 2008).

In natural resource management, the multi-level governance system can be considered as the full set of actors and agencies, institutions, and processes (formal and informal), which decide on or affect decisions on how natural resources are used and managed (Nunan, 2016). In addition, it is also argued that the multi-level governance system provides a framework suitable for analyzing the complexity of scale in natural resource management (Termeer et al., 2010). Furthermore, Armitage (2008) suggests that the concept of multi-level governance can solve the challenge related to collective action by minimizing the governance costs as well as recognizing various benefits and opportunities of spatial catchments.

The forest ecosystem is believed to have the most complex interactions to be included, namely social, ecosystem, and institutional interactions that affect the condition of the forests (Poteete and Ostrom, 2004). Ribot et al. (2006) suggest that the complexity is related to aspects of multi-level governance, such as procedures in policymaking and implementation that can encourage public and community participation and democracy over forest resources.

In terms of levels where the governance occurs, multi-level governance focuses on two: first as administrative levels, and second in an analytical sense (Gibson et al., 2000: 218). "Administrative" refers to national administration levels that are determined by the

government from the national (including central, district, and village) and beyond national levels (international levels). The levels are often linked to legal mandates, resources, remits, and a set of functions. Meanwhile, levels in an analytical sense refer to "the units of analysis that are located on the same position on a scale", where "scale" refers to "the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon" (Gibson et al., 2000: 218). Poteete (2012) suggests that within these levels, multiple actors that are associated with territorially or functionally institutions may exist.

Meanwhile, in the situation where various actors are involved, Poteete (2012) identifies two types of actors involved in multi-level governance: those who are directly involved in institutional design such as government agencies, NGOs, or international donors/organizations, compared to those who are affected by institutional design, including livelihood strategy, ethnicity, gender, and age. Nunan (2018) suggests that the number of actors involved in governance may be increased when non-government actors are involved in the governance. In addition, Nunan (2018) argues that the involvement of many actors contributes to creating a challenge related to the process of identifying which actors that are relevant to be involved in multi-level governance to make the governance system 'fit' the biophysical system. This is because a mismatch of governance to the biophysical system may lead to another challenge of the effectiveness of governance, bridging organization, as well as coordination and collaboration (Baggio, 2017; Cash et al., 2006). Bridging organization refers to a formal organization with a specific mechanism of collaboration (Crona and Parker, 2012). Therefore, it is advised that multi-level governance comes with initiatives and provides guidance on how to identify actors within the governance by observing the role of civil society actors in facilitating interactions between actors both across and within levels (Sattler et al., 2016). Yet, the dominant role should be determined and played by the state, so the state can influence the uptake and give direction to such schemes and ensure that interaction remains within the governance system (Matzdorf et al., 2013).

Multiple actors and levels in a multi-level governance system create challenges related to interaction between actors from different levels (Mwangi and Wardell, 2012). Nunan (2018) suggests two processes of interactions that have been recognized in multi-level governance: horizontal interaction (between actors from different institutions) and vertical interaction

(within actors in one institution). The existence of horizontal interactions can facilitate cooperation and coordination between actors at any level, whilst vertical interactions facilitate the flow of resources, information, and decisions up and down the system (Nunan, 2018). In addition, Nunan (2018) argues that the interactions in multi-level governance are associated with several activities – e.g., planning, budgeting, revenue generation, and expenditure – that occur between actors involved in natural resource governance, often within a context of a legal mandate, these are dependent on willingness, incentives, and capacity to interact. Cross-level interactions in the context of multi-level governance are utilized to facilitate the network that consists of actors operating at different levels of governance; It is, therefore, necessary to improve cross-level interactions through bottom-up policy processes to increase more active participation from local level or through prominent network communities that operate across levels (Ingold, 2011).

However, it is found that the implementation of such interactions (horizontal and vertical) requires a particular mechanism to facilitate the participation of actors from all levels (Adger et al., 2005). The mechanism can be through the system of representation to share and make the information flow, and dissemination of decisions (Adger et al., 2005). Nunan (2016) argues that even though interactions are required, the frequency of interaction in practice may be infrequent or even non-existent due to limited coordination and cooperation between actors which often leads to a lack of policy in general. The situation where interaction is difficult to be conducted is referred to as the "coordination dilemma", resulting from "transactions costs of coordinating of multiple actors at multiple levels" (Termeer et al., 2010: p.5). Benz (2010) suggests that the coordination problem in multi-level governance, particularly in the decision-making process, can be solved through negotiation and/or a competition system between actors (state and non-state) at each level. In practice, Adger et al. (2005) argue that to solve the coordination problem, the actors involved in the interactions prefer to bypass intermediate levels creating networks that form as actors seek alliances and solutions to complex problems of governing ecosystems.

With interaction and coordination between actors' key issues in multi-level governance, network governance is believed to be the answer to solving the coordination issue (Provan and Kenis, 2008). Pahl-Wostl (2009) and Ostrom (2009) contend that networks in governance can be expected to solve the emerging issue of "coordination" that occurs within

and between actors involved in the governance of natural resources. It is the structure within the network governance that allows for the coordination to be simplified as well as to facilitate coordination by cutting across levels in decision making (Robins et al., 2011; Ostrom, 2005). In addition, Provan and Kenis (2008:232) claimed that network governance itself can be viewed as "a mechanism of coordination".

Some elements have been identified to influence networks in governance, such as the increasing importance of private sectors, NGOs, scientific networks, and international institutions that performed various functions of governance (Diani and McAdam, 2003). Ostrom (2001) suggests that those elements can create a synergy between different competencies (different actors) and sources of knowledge (different backgrounds) to deal with complex and interlinked problems.

In the implementation, many other problems, such as environmental and organizational leadership, can be solved by network governance rather than coordination alone (Bixler et al., 2016). This is related to the framework of network governance that considers relationships between multiple levels of governance, cross-scale linkages, and collaboration across multiple and overlapping but separate issues (Bixler et al., 2016). According to Scarlett and McKinney (2016), by creating a conducive environment, network governance generally can challenge contemporary environmental governance.

Another governance system is polycentric governance has been recognized as a complex governance system due to its many centers of decision-making that operate with some degree of autonomy (E. Ostrom, 2005). It is often labeled as "overlapping" governance (McGinnis and Ostrom, 2011). Polycentricity is defined as "one where many elements are capable of making mutual adjustments for ordering their relationships with one another within a general system of rules where each element acts with independence of other elements," (V. Ostrom, 1999: p.57). This definition refers to sets of nested institutions that shape the behaviour of interdependent actors and their performance (Aligica, 2014).

The existence of nested structure in polycentric governance appears similar to multi-level governance as the dimension in the latter leads to a specific mechanism called 'nested structure' (Ostrom, 1990; Poteete, 2012). However, there are differences between nested

structures in multi-level governance and polycentricity. Nunan (2016) notes that nested institutions in multi-level governance are utilized to facilitate the interactions (vertical and horizontal) so the information, plans, and resources can flow up and down multiple levels. On the other hand, nested structure in the polycentric model functions to solve the problem of fit (institutional and system function) on different scales (Wyborn and Bixler, 2013). For this reason, the polycentric governance approach is believed to be able to challenge the blueprint of a governance scheme a one-size-fits-all (Anderson and Ostrom, 2008).

In its implementation, the polycentric governance approach can also be utilized to explain the outcome of the decentralization system. Actors in polycentric governance look beyond the performance of a local government unit to consider the relationships among governance actors, problems, and institutional arrangements at different levels of governance (Andersons and Ostrom, 2008). In addition, the multilevel configuration in the polycentric governance approach may also be capable of balancing the centralized and fully decentralized government system (Imperial, 1998). However, Marshall (2015) argues that because there are multiple and semiautonomous decision-making centers, it does not guarantee that there would be sufficient and effective coordination between the decision-making centers in polycentric governance. It is suggested that to achieve success in implementing polycentric governance system, it is key to enable institutions of multiple scales to be more effective in blending local knowledge with scientific knowledge by allowing participants to operate at many different scales (Berkes and Folke, 1998). It is considered to be a more effective approach than simply considering polycentric as the opposite of centralization or mere decentralization (McGinnis, 1999).

To conclude, three types of governance can be utilized to explain the complexity of natural resource governance which are multi-level governance, network governance, and polycentric governance. Each governance system has different characteristics and impacts: the multi-level governance system is characterized by the involvement of various actors that occurs at different levels but can lead to issues of coordination and interactions; network governance that can simplify the coordination issue in multi-level governance; and polycentric governance that is characterized by having multiple decision-making centers known as the nested structure that is rather similar to multi-level governance. Nevertheless, nested institutions in the polycentric type are utilized to solve the problem of fit rather than

to facilitate coordination as occurs in multi-level governance. In fact, the multiple decision-making centres in polycentric governance make this governance system complex and are prone to overlapping.

2.4 Decentralisation of natural resources

The complexity of natural resources caused by the governance system also happens in decentralized countries. It is related to the involvement of multiple stakeholders in natural resource management that occurs at different levels and is closely connected to the concept of decentralization (Nunan, 2018). In decentralization, a multi-level governance system is believed to be able to combine decentralized adaptive governance that is sufficient to grow local initiatives and maintain networks to enhance collective action across scales (Underdal, 2010). This is because the multi-level governance system involves three dimensions that are related to power-sharing and authority relations: (1) devolution which refers to delegating power from central governments to local governments; (2) increasing sharing between the state and civil society, and (3) reduction of state authority, for example through joining the international coordination mechanisms (Piattoni, 2009).

Decentralization is defined as a transfer of power within authorities from central to lower authority levels in a political-administrative as well as territorial hierarchy (Ribot, 2004). It is differentiated into three major forms, namely deconcentration, delegation, and devolution (Rondinelli, 1992; Parker, 1995). Deconcentration is described as the process of dispersing responsibility from central government to its number of branch offices at the regional level without transferring any authority or involving government at lower levels (Litvack et al., 1998). Nevertheless, Rondinelli (1999) notes deconcentration is often considered to be the weakest form of decentralization.

Delegation, as defined by Litvack et al. (1998), refers to the transfers of responsibility for administration of public function and decision-making from central government to local government, or to any other semi-autonomous organization which is accountable and partly controlled by the central government. Meanwhile, devolution is described as an arrangement that can occur when the central government transfers its authority for decision-making, financial allocations, and management to quasi-autonomous units of local government.

According to Litvack et al. (1998), this transfer of responsibilities is usually to municipality level to be able to do everything by themselves/independently, including the mayor and council elections, raising revenue, and wielding the authority to make decision-related investments.

Decentralization is divided into two types: democratic decentralization and administrative decentralization (Ribot, 2000). Democratic decentralization is often considered as representative and downwardly accountable to local governments that have autonomous, as well as power, resource, and decision-making, discretion to make important decisions related to local livelihoods (Ribot, 2004). It refers to the transfer of power and resources to lower-level authority, for example, local government at municipal level, state government (in the federal system), or autonomous regional government. Democratic decentralization emphasizes the linkages between state and people, and hence between decentralization and participation. Litvack et al. (1999) argue that due to the linkage between participation and decentralization, a symbiotic relationship has been created: on one side, to be successful decentralization needs local participation to some degree to ensure the local government responsiveness to local needs; and on the other side, by placing more power and resources at a level of government that is closer to the people, the process of decentralization can itself influence and enhance the opportunities for local people to participate. Hence, Litvack et al. (1999) cite participation as both a means to and a goal for the success of democratic decentralization.

In contrast, administrative decentralization (or deconcentration) refers to the power transfer by central ministries (in the capital) to their branch offices located outside the capital (Ribot, 2004). In practice, however, Ribot (2004) finds that democratic decentralization is rarely implemented based on the suggested theory. In fact, the central government agencies may be reluctant to redistribute power and resources, and often they find ways to retain power and resource even though the policies suggested otherwise (Larson, 2003). Ribot (2004) suggests that commitment and training from the central government are needed to make decentralization more effective, especially to build the capacities of local government, and promote equity. Larson (2008) contends that as decentralization is part of the political and economic processes in a redistribution of power and resources, it helps to avoid the

weakening of central government. Hence, decentralization should strengthen both central and local governments (Larson et al., 2005).

With the transfer of power within natural resources in the decentralization system, two impacts have been noticed; first, it presents a great opportunity, particularly to increase the relationship between the local stakeholders and local communities, and second, it poses a threat to central governments who fear losing patronage resources (Larson and Ribot, 2004). The latter coming impact of natural resource decentralization has caused the central government in the forestry sector to resist the transfer of real power to other entities in many countries (Larson, 2008; Peluso, 2002). Yet, decentralization of natural resource management can be a better way to accommodate various interests of local people to manage and sustain the natural resources (Mahdi et al., 2017). Larson and Ribot (2004) underline that under the right arrangement and circumstances, the decentralization system can improve democracy, efficiency, equity, and resource management.

Decentralization is recommended to achieve 'good governance', the condition of institutional reforms that should 'bring the state closer to the people' and increase its accountability and transparency (Baumann, 2000:17). Good governance, it is- argued, can be achieved by strengthening local government capacities as well as efforts to encourage the involvement and participation of local communities and other local 'stakeholders' in natural resource management and other development activities (Larson, 2008). This is also related to the strategies of decentralization that are expected to promote local participation in natural resource management 'from below', along with increasing the welfare of poor communities and natural resource user dependents (Suman, 2019). Gibson et al. (2000) suggest that the increasing practice of decentralization of natural resources management is in recognition that the control and management of natural resources could be more effective with the involvement of local people in the decision-making process and implementation of the rules. Therefore, it is believed that decentralization can exert a significant influence on the management of natural resources (Larson, 2008).

Among natural resources, forests are the most in demand spaces and are highly contested by many actors (Doornbos et al., 2000). This is related to the functions of forests that in many ways have been an effective proxy for natural resources due to their relationship to other

essential resources like water, and other biodiversity resources. (Larson, 2008). Thus, within the decentralization of natural resources, forests have become the most important resource to be concerned about as well as to obtain major attention, particularly to answer crucial questions related to decision-making over and the benefit of the resources (Larson, 2008). Several aims of decentralization in forestry are acknowledged, such as reducing costs, increasing the revenue of the forestry department, and heightening control over local people (Colfer, 2005).

Two approaches to the implementation of decentralization of natural resources management have been proposed. The first is to devolve property rights over natural resources to local communities; the second is to hand over the formal powers of government to its subunits (Anderson et al., 2004). Both ways claim that outcomes will be more efficient, flexible, equitable, accountable, and participatory (Anderson et al., 2004). Therefore, the implementation of decentralization must be capable of transforming the past institutional stigma, such as central government domination, and allowing more effective resource conflict management and facilitation of joint environmental resource development (Meyren and Doornbos, 2004).

In conclusion, decentralization – the transfer of power within authorities from central to lower authority levels in a political-administrative as well as territorial hierarchy – is one of the factors that can increase the complexity of natural resource governance. Implementation of decentralization in the natural resource sector remains poor, and instead often causes confusion among actors involved in resource management. This is related to various resource, policies, including forest resources, often undertaken in decentralization. Thus, it is suggested that greater attention and understanding are sought on how decentralization over natural resources can generate effective natural resource management.

2.4.1 The role of local government agency

Local government actors play an important role in linking the state and resource users (Messer and Townsley, 2003). This refers to the interface bureaucrat or street-level bureaucrats, the government actors who implement the policies and interventions in daily practices, and their position as well as subjectivities at local state institutions (Lipsky, 2010;

Funder et al., 2019). In addition, Funder et al. (2019) argue that the local government actors have an important role in implementing state policies, laws, and projects at the lower level.

This section discusses aspects such as local government's role in daily work, the challenges they face in doing daily work, and their relationships to other actors related to state government actor practices on natural resources governance. In the field of natural resource governance, interface bureaucrats or street level government actors are government staff that is employed by the local level sectoral institutions or ministries, and associated line agencies within sectors of forestry, agriculture, environmental management, or many other sectoral institutions (Funder et al., 2019). Their position as an interface actor (between the state and the citizenry) leads them to interact with all other actors involved in natural resource government (Funder et al., 2019). Cornea et al (2017) suggest that the local state actor's role as daily regulators and implementers of state programs, policies, and laws gives them influence and intervention in the practice of natural resource management. This is the reason why their position is important (Cornea et al., 2017).

In practicing natural resource management, interface bureaucrats exercise their work based on procedures, rules, and laws implemented in the institution (Funder et al., 2019). The frontline state government is usually given the authority by a high degree of discretion in implementing rules or regulation and this enables them to devise their own rules and interpretation related to implemented rules and regulation (Lipsky, 2010). The authority is important to make the community understand the state interventions or regulations because at the ground level the community is initially resistant to acceptance of accept state interventions; instead to reshape, resist, or even engage with them (Funder et al., 2019). In addition, this authority can support the important role of the interface bureaucrat in connecting state and community (Gupta, 2006).

However, in their everyday operations, the interface bureaucrats face resource constraints such as lack of staff, operational funds, and limitations related to facilities (De Herd and Titeca, 2016). Funder et al. (2019) argue that the limitations influenced the ability of the staff to conduct physical outreach, particularly those who work in large geographic areas.

As government staff, state bureaucrats have networks and relationships with other government actors from different institutions, as well as within the institution. These include both senior staff in higher tiers of the office (at provincial and national levels) and peers (Hupe and Hill, 2007; Funder et al., 2019). Therkildsen (2014) suggests that the relationship between the interface bureaucrat and the superiors is related to reporting work plans and practice routines through official procedures based on the office hierarchy. The network, however, can both support or for their work (Hupe and Hill, 2007). Therefore, the interface bureaucrat should maintain such relations with formal and informal dimensions because some aspects – such as patronage and nepotism – might arise, for example in the process of promotion (Funder et al., 2019).

Interface bureaucrats must also maintain peer relations because they play an important role in the process of informal practices, mostly related to professional work and personal management (Blundo, 2015). In addition, Funder et al. (2019) suggest that the importance of peer relations is for mutual favours, practical reasons, and coordination to overcome the scarcity in resources that are often faced by interface bureaucrats. The latter include having to share only office vehicles or having to ask the help of other staff to organize meetings with the community.

Regarding relations to staff across different institutions or agencies, it is apparent that the interface bureaucrat must compete with staff from other institutions who have the same legitimacy and authority to manage the resources (Sikor and Lund, 2009). This often happens to government agencies that work within natural resource management, for example, agriculture and other agencies, who have the authority in natural resource management that sometimes their working target and working space overlap (Funder et al., 2019). In this case, the interface bureaucrat recognizes to have another key role in creating and extending the legitimising strategies (Sikor and Lund, 2009).

To conclude, the role of local government actors, and in particular, the government staff tasked to connect the state and the community (interface), is essential in natural resource management. Important roles are in the range of implementing state policies, laws, and projects at the lower level. They are important because the community does not passively accept rules or regulations implemented by the government but shows different reactions.

Thus, the interface bureaucrat as part of government is needed to interpret the rules and regulations to be more accepted in the community. This important role is often not supported by adequate facilities, and they face various challenges, including a lack number of staff that are sufficient, operational funds, and limited low facilities in their daily work.

2.5 Community-based (mangrove) management

The key to effective decentralization is increased broad-based participation in local public decision-making. Theorists believe that downwardly accountable or representative authorities with meaningful discretionary powers are the basic institutional elements of decentralization that should lead to local efficiency, equity, and development (Agrawal and Ribot, 1999; Mandondo, 2000).

Community is defined as the structure of relationships through which a localized population meets its daily requirements with interaction as an important component (Luloff & Krannich, 2002). This section reviews community participation particularly in mangrove management from several perspectives. The local community has an important role in mangrove conservation. Most local communities are users dependent on resources that are necessary to their lives (Gibson et al., 2000). Local communities that benefit from mangroves and other resources provided by mangroves have considerable knowledge of the ecosystem (botanical and ecological knowledge) (Walters et al. 2008). Heltberg (2001) suggests that their involvement in management is expected to be a solution to reducing resource degradation. The involvement of the local community is commonly under the community-based resource management arrangement.

Community-based mangrove management is often defined as mangrove forests management and rehabilitation that involves and is driven by the community in the process of the management directly (Walter et al., 2004). In addition, Datta et al. (2012) argue that it is mostly at the initiative of the government which aims to conserve the ecosystem of mangroves and improve livelihood. In many countries, Community-Based Mangrove Management has become an alternative for mangrove forests sustainability (Datta et al., 2012).

Community-based mangrove management (CBMM) is often integrated to the concept of community-based natural resource management of CBNRM broadly. This refers to the decentralization of rights, authority, and responsibility of government to the communities in terms of managing natural resources (Alcorn et al., 2005). However, Datta et al. (2012) argue that the concept of CBMM is different from other CBNRM because, unlike other ecosystems, the mangrove ecosystem is unique (being located in an intertidal area). It, therefore, involves many actors in management along with various government implications (such as coastal protection, eruption resistant function, aquaculture practices, economic return, dispute or conflict-related transnational boundaries, as well as capital investment). In addition, Melana et al. (2000) underline that the core of community-based mangrove management lies in the concept that "[put] people first and the sustainable mangrove forest management will follow"; it refers to the fact that community participation will increase as their well-being is secured. Many countries that adopt the concept of CBMM as an approach to build community participation also consider well-being perspective is important, because, in fact, the lack of income-generating options may lead to the practice of mangrove exploitation by the community (Zorini et al., 2004).

Many CBMM programs have been initiated and implemented by governments and associated institutions worldwide. Datta et al. (2012) note that the success of the implementation by the government lies in the complex mechanism of interaction between the community and environment, which at the same time intersect, cut across and overlap the diverse realm of social, economic, cultural, ecological, and political sustainability.

2.6 Governance principles in multi-level governance

The involvement of multiple actors that interact at different levels in multi-level governance of natural resources has led to challenges related to the conduct of governance (Termeer et al., 2010; Poteete, 2012). This is related to the diversity and range of actors and interactions that often make responsibilities among actors unclear; for example, who should be responsible for decision-making or/and reporting (Lockwood et al., 2010; Springer, 2016). Several key components are suggested that influence the conduct of governance such as accountability, legitimacy, transparency, and inclusiveness including representation and participation, integration, fairness, capability, and adaptability (Lockwood et al., 2010).

The importance of including governance principles (Lockwood et al., 2010) in the research is related to the analysis of mangrove governance in practice. It has already been observed that in practice mangrove governance is conducted at multiple levels and involves multiple actors from different sectors. The actors are involved in managing mangroves through various arrangements. Thus, it is necessary, for example, to analyze whether the actors have legitimacy to be involved in governance, and through what mechanisms the actors secure or earn legitimacy. Legitimacy is one of eight governance principles introduced by Lockwood et al (2010).

There are multiple sets of governance principles identified in literature, including grey literature such Gisselquist's (2012) review of definitions of good governance adopted by development partners. Use of similar sets of governance principles by development partners in different parts of the world demonstrates their wide applicability as an analytical tool. Within literature on natural resource governance, sets of governance principles are provided by Lockwood et al. (2010) and Springer (2016), with overlapping principles between the sets. Lockwood's set is used as an overarching guide for this research as it has been more widely adopted in literature, including by Nunan (2018). For each principle, however, wider literature is reviewed, to critically reflect on how each component of governance performance can be investigated and understood in different contexts.

2.6.1 Legitimacy

The first to review is legitimacy as one of several critical aspects of natural resource governance (Lockwood et al., 2010). Legitimacy is concerned with compliance to legal norms: the content of a decision should be in accordance with the law to be legitimate (Bekkers and Edwards, 2007). It refers to the acceptance of authority, which is associated with people who are willing to support it for good reasons (Fung, 2006). This reference is supported by Bernstein (2005, pp. 142-143) who defined legitimacy as "the acceptance and justification of shared rule by a community and related to the question of who is entitled to make rules and how authority itself is generated".

In the multi-level governance system, Suškevičs (2012) argues that chance for actors involved in natural resource management to achieve legitimacy is more challenging. As

previously discussed in the multi-level governance section, the notation of 'multi-level' connotes the multiplicity of levels of jurisdictional, scales, administrative, spatial, and sharing power within and across them. Therefore, it would be more challenging to achieve legitimacy due to the multi-level system often resulting in a non-hierarchical governing system that is characterized by no center of accumulated authority (Hogl, 2002: 302; Peters and Pierre, 2004: 79; 83).

Legitimacy is obtained by the actors through various mechanisms. One of the mechanisms suggested is the electoral processes, particularly for government actors (Boedeiltje and Cornips, 2004). Furthermore, Lockwood (2010) suggests that this mechanism mostly occurs in a country with democratic system and within this system, the local government usually gets its authority/ legitimation directly which is through legislation enacted by government at a higher level. However, in some countries with a decentralization system, the local government acquires legitimation through direct electoral processes (Lockwood, 2010). In addition, it is argued that the legitimacy earned by the government agencies through the democratic authority is usually vested in governments to pass enabling legislation, while the power to authorize actions and decisions as well as to delegate responsibility to agency officials are vested in the ministry (Boedeiltje and Cornips, 2004).

Apart from the electoral processes, Newman et al. (2004) suggest that legitimacy can also be acquired through efforts of government bodies, for example in producing outcomes, taking leadership, and generating consensus around a vision. Boedeiltje and Cornips, (2004) describe the way to achieve legitimacy through effort as ‘earned or output legitimacy’. ‘Earned legitimacy’ is important for the government (along with their agencies and statutory authorities) to complement the legitimacy they conferred through election processes in the democratic system (Lockwood, 2010).

Meanwhile, longstanding relations, and connections between people and one (particular) place, are considered mechanisms to obtain legitimacy as well (Proshansky et al., 2005). It particularly applies to local people (Proshansky et al., 2005). The strong bond to a place is manifested through interaction and protection to nature. Thus, through this mechanism, the local people can earn legitimacy (Relph, 1976; Vanclay, 2008).

Meanwhile, legitimacy through partnership is a mechanism mostly achieved by NGOs (Lockwood et.al., 2010). This mechanism is implemented through a partnership with other organizations that have already been conferred legitimacy or earned legitimacy by assist them in achieving the natural resource area objectives for which they are responsible. In addition, it can also be achieved by engaging with and supporting a constituency by giving participative democratic contribution to the area where they implemented their program that should be aligned with the community interests (Lockwood et.al., 2010).

Different key important factors are suggested to enhance legitimacy, such as participation, coordination, and expert involvement (Metcalfe, 2001; Hogl et al., 2012). Participation can enhance legitimacy by giving government stakeholders and community equal, balanced, and fair access to political processes by ensuring that the voice of non-government actors is heard and taken into consideration in the decision-making (Hogl et al, 2012). According to Metcalfe (2001), participation can improve legitimacy by giving a participating non-government actor better knowledge and insight related to political processes. At lower-level governance, participation of the local community refers to the procedure through which the government actors and community share their concerns and differences, exercise their duties and rights as well as enter into collaboration to produce outcomes based on their goals (Michels and Graaf, 2010). It is argued that through participation, local communities can hold government service to be more accountable, and more transparent (in terms of decision), as well as legitimize actions by forcing the actors who have authority in decision making to make local rules and regulations as the basis of the decisions made (Brett, 2003). In addition, the community tends to have better acceptance and feel more satisfied (to the governance arrangement), thus they are willing to support the formulated policies and other related governance matters that involve community (O'Toole and Burdess, 2005). Community participation, therefore, helps increase government processes and programs (in terms of quality) across the local level (Taylor, 2007).

Apart from participation, coordination also contributes to legitimacy through better shared (and exchanged) information, the chance to give feedback, conflict resolution (for example, by involving an arbitrator), and joint priority setting (Metcalfe, 2001). Moreover, Peters (1998) argues that coordination can lead to the establishment of policy strategy which is more consistent and comprehensive by reducing redundant interaction and creating more

coherent policy with no gaps. Meanwhile related to expertise, Hogl et al. (2012) suggest that policy-making that is based on expert-advise can help produce and enhance legitimacy in different ways including putting expert advice apart from political interests, and the process of advisory should be organized in a transparent way. Furthermore, Hogl et al. (2012) stated that input from experts should lead to the policies rationalization with less instrumental reading in order to create outcomes that is more robust.

In analyzing the legitimacy aspect of governance, Lockwood (2010) and Nunan (2018) present key points to make the analysis more focused: (1) identification of which governance actors have authority or are conferred with the legal mandate; (2) the commitment of the government actors across levels in conducting the authority or mandates and the way they demonstrate the commitment; (3) perception of legitimacy from actors within and beyond the governance system. In addition, Lockwood (2010) suggests some expected outcomes to be achieved from assessing legitimacy in governance such as: (1) clarity in authority (or legal mandate) to be conferred to the governing body; (2) acceptance from the stakeholders toward all the authority of the governing body; (3) synchronization between the government body act with the authority of mandate conferred to them; and (4) integrity and commitment performed by the Governors.

To conclude, legitimacy is a legal norm that actors can achieve through various means, such as elections, from their office, or from the community that accepts the authority and is willing to give support. Legitimacy consists of several key important factors that enhance it, such as participation, coordination, and expertise involvement.

2.6.2 Transparency

Transparency is a fundamental tool to promote efficiency and accountability in natural resource management; Bellver and Kaufman (2005: p.4) consider it “the increased flow of timely and reliable information (social, economic, or political) which is accessible to all relevant stakeholders”. This definition limits the concept of transparency to information disclosure. Epremian et al. (2016) argue that the definition should be broader and include the ability of the receiver to process and understand the information, so the information can be utilized. Florini (2007: p.5) gives an even broader definition of transparency as “the

degree to which information is available to outsiders that enables them to have informed voices in the decision and/or to access the decisions made by the insiders". From the latter two definitions, it can be assumed that transparency is not only about making information available but also accessible.

Visibility, clarity, and availability are key important features of transparency (Lockwood et al., 2010). Visibility is explained to be associated with the process of decision making related to the actor making the and how it has been reached and its justification. Clarity refers to expressing the reasons behind decision-making. Meanwhile, availability pertains to information about the governance authority and performance. Therefore, the government authorities should also provide information to the stakeholders related to the reason behind the making of a decision along with all processes required to implement the decision (Stratford and Davidson, 2000). Through promoting transparency, people can recognize the actors who made the decision, along with its justification (Lockwood et al., 2010). This means that stakeholders have the right to request the available information in any form they require. For example, the information should be made available in the common language used by most of people, or the information should be presented in both soft and hard copy versions. It would not be enough to only provide it on a website because there might be limited access to the internet, or it might be difficult to share information in a community where difficulty reading documents persists. (Stratford and Davidson, 2000).

Transparency is also considered a way to open the channel to increase communication as well as allow the detailed examination of how the natural resource is extracted and generated, and the benefits (revenue) gathered from it (Meija Acosta, 2013). Corrigan (2014) argues that transparency within the government can be expected to reduce and mitigate some adverse effects on the economy and governance performance by increasing the level of effectiveness of the government. Together with accountability, transparency, in general, can effectively contribute to the development of the governance outcome such as poverty alleviation and increasing socioeconomic conditions (Meija Acosta, 2013). Several studies have been conducted to examine how transparency (and accountability) affect institutional quality. Andreula et al. (2009) believe that government transparency, especially related to fiscal (concerning revenues) is really a matter to determine the quality of institutional or governance factors. In addition, Islam (2003) finds that a correlation that countries with

higher transparency and concern about information flows mostly have a good quality of governance. This is because corruption or attempts at fraud actions can be reduced in line with the impact of the implementation of transparency (Kolstad and Wigg, 2008).

Regarding the mechanism to show transparency, Stratford and Davidson (2000) cite an essential element of reporting information that must be recognized by the governance authorities. The government authorities should report all of their work progress regularly-, (for example) to their superior or stakeholder through a mechanism that might be different from one government office to another, such as through an annual report, management plan report, or evaluation of effectiveness of governance (Lockwood et al., 2010). To be transparent, the data information in the report should be accurate and relevant, and the stakeholder should have the opportunity to respond to and analyze it (Lockwood et al., 2010).

From the literature, it can be concluded that availability of information and accessibility to it are the two important features that need to be considered in delivering transparency. Information includes who makes the decision, visibility or clarity of mechanism or processes of decision making, reasons underpinning decision making (that should be communicated), as well as the reporting mechanism.

2.6.3 Accountability

The third principle that becomes an issue in governance is accountability (Lockwood et al., 2010). Moore et. al., (2010) define accountability as the principal requirement for actors to receive power or authority as well as answer for actions they have undertaken. Robbins (1998) relates ‘power’ to the potential possessed by institutions or individuals to influence others' behaviour, while authority refers to legally or regulated founded mandates, responsibilities, functions, jurisdictions, or tasks of an official or organization. Meanwhile, Boven (2007; p.450) refers to accountability as the relationship between actors involved, and thus defines accountability as “a relationship between an actor (accountor) and a forum (accountee), in which the actor has an obligation to explain and to justify his or her conduct, the forum can pose questions and pass judgment, and the actor may face consequences.”

In the context of natural resource governance, the actors include government actors and non-government actors (community, NGOs, private sector) that have power or authority in decision-making or have influence over the decision-making related to natural resources (Nuesiri, 2016).

Accountability can be distinguished between horizontal, vertical, or diagonal accountability (O'Brien and Stapenhurst, 2005). Biela (2014: p.4) explains that vertical accountability "is characterized by a hierarchical principal-agent relationship". Through vertical accountability, the actor, (for example community and other non-government actors) can obtain the performance of the official based on standard (good) or not (O'Brien and Stapenhurst, 2005: p.1). According to Schillemans (2008: p.390), horizontal accountability is the condition where the forums (accountee) are not hierarchically superior to the actor who has the authority (accountor). Horizontal accountability occurs, happens for example, when the government executive branch must give account to the legislature (Schillemans, 2008). In practice, Rosenau (2000) argues that mostly vertical accountability tends to be more dominant over horizontal accountability.

Larson and Soto (2008) suggest the reason behind the dominance of vertical accountability is due to the governance actors at the devolved level prefer to give the report related to natural resources upward rather than send it downward to the community; and similar things have also happened at regional and national levels (Ribot, 2003). Upward accountability is to the government at territory, state, and national levels with limited accountability, and downward accountability to government at lower level (regional and local) and community (Moore and Rockloff, 2006). However, Larson and Soto (2008) argue that there is a lack of concern particularly related to downward accountability in the decentralization of natural resources. This was reportedly the case in Australia (regionally for resource management), where the accountability of natural resource management tends to be a one-way affair and upward to higher (national) level, with limited accountability downward to the regional and local community, or even to partners (Moore and Rockloff, 2006).

However, a different arrangement is implemented in Indonesia. Due to the implementation of decentralization of forest resource management, the local government has the authority to manage the resource without doing either upward accountability to the central government

or downward accountability to the local community (Djogo and Syaf, 2002). In such a situation when there is a tendency that the government actor is unwilling to distribute influence or power to non-governmental actors in the horizontal network, there should be proper access to information for the citizens to enhance participation (Rosenau, 2000).

Lack of accountability (vertical and downwards) will affect the power distribution within a governance system (in multi-level governance) and also potentially the ability to hold actors and structures to responsible for their decisions, especially from governance actors at the higher level (Nunan, 2018). To overcome the lack of accountability (vertical and downwards), O'Brian and Stapenhurst (2005: p.3) suggest diagonal accountability, which is explained as the condition that results when vertical and horizontal accountability is combined. This type of accountability requires interaction and engagement between the vertical accountability actors and citizens in the working of horizontal accountability institutions through breaking the government's monopoly over responsibility for official oversight. It aims to strengthen the function of the citizen volunteers in environmental monitoring (O'Brian and Stapenhurst, 2005: p.3).

In addition, accountability is identified to have five dimensions which are transparency which refers to institutional performance in giving (sharing) accurate and comprehensible reports and information; controllability is explained to be related to power who are able to give sanction or reward regarding institutional performance; liability is related to decision-making procedure and processes; a responsibility that related to the degree of officials actions whether the actions are based on the rule, law or norm; and responsiveness refers to the ability of actors who have the power to articulate and meet the demands of the community (Kopell, 2005). However, Kopell (2005) argues that transparency is the most fundamental dimension because, without transparency, controllability and liability would be ineffective.

Accountability is the key element in practicing public officials to be responsible for their performance and attitude in implementing their authority (Ribot, 2000). In addition, Agrawal and Ribot (2000) contend that the accountability of power-holding actors to their constituencies are important indices of democratization as this broadens popular participation. Nevertheless, Ribot (2002) and Hugo (2002) state that to establish the mechanism of accountability (including electoral, financial, environmental, and social

accountability, reward, and punishment) governance should have the rule of law as the main foundation. The rule or regulation requires an important component which is 'compliance' that refers to the observation of legislation, codes, standards, and systems, such as internal or external audits or other reporting requirements (Lockwood et al., 2010).

To analyze accountability, a set of key points can help make the analysis more focused that including identifying the systems and processes for holding actors and structures to account, along with the frequency and the effectiveness of the system and processes; clarifying the roles and responsibilities of the governance (governing bodies) in managing public resources (should be fair and effective); the degree of the governance performance that associates to how well is governance working and why; evidence of the existence of downward and upward accountability, or formal and informal accountability, or vertical and horizontal accountability; and, identifying any action to control the abuse of executive power as well as securing effective operation (see Nunan, 2018 and Lockwood et al., 2010).

To conclude, accountability is a principle that is required for actors to receive power or authority. It can be distinguished between horizontal, vertical, or diagonal accountability. Accountability is the key element for public officials to be responsible for their performance and behaviour in implementing their authority.

2.6.4 Inclusiveness

On the fourth principle of inclusiveness, Lockwood et al. (2010) refer to it as the process of government actors seeking input from multiple different sources. Inclusiveness is important to deliver successful governance of natural resources in the complex multilevel with various involvement of agencies (Schusler et al., 2003). Different and multiple sources are believed can give more diversity in value and awareness, as well as more structure and policies to foster contribution and engagement from stakeholders (Stokes et al., 2006). Meanwhile, Rittel and Webber (1973) argue that access to the various sources is also important, along with perspectives and knowledge due to problems (for example) in natural resources management are hardly solved by a single actor. Lockwood et al. (2010) suggest that inclusive governance can ensure the availability of opportunities for stakeholders to participate in and give influence in decision-making processes and actions. Davidson et al

(2006) conclude that a governance system can be considered inclusive when all stakeholders who are taking part in the governance system can be equally engaged based on the rights provided to them.

Inclusiveness in natural resource governance can be implemented through collaborative governance. Anshell and Gash (2008) refer the collaborative governance as the method of collective decision-making where government and non-government actors engage together in a process with the deliberate aim of implementing public policies and procedures for managing public resources. However, collaborative governance is a highly demanding process because it is time-consuming with a less certainty outcome and in most cases and shows a lack of commitment. Stakeholder manipulation can also result in lasting animosity among the member of the collaboration group (Huxham and Vangen, 2004; Imperial, 2005). Nevertheless, when implementation of collaboration is successful it can lead to increase in government accountability through greater community engagement, and higher level of progress in implementing program (Fung and Wright, 2001).

To analyze inclusiveness, several key points are suggested to make the analysis more focused (Nunan, 2018; Lockwood et al., 2010) such as the mechanism in governance that enables all stakeholders to participate in and influence the process of decision-making as well as the outcome; the basis of representation across levels; and the way the representation changes between levels, and its implications.

It can be concluded that inclusiveness is a process of government actors in seeking input from multiple different sources that is important to deliver successful governance of natural resources in the complex multilevel with various involvement of agencies. It is believed that inclusiveness can ensure the availability of opportunities for stakeholders to participate in and give influence in decision-making processes and actions.

2.6.5 Fairness

Fairness as one of the governance principles refers to some aspects given to stakeholder views such as respect and attention, as well as consistency in decision making (Lockwood et al., 2010). However, Davidson et al. (2006) prefer to describe fairness in governance as

equitable responsibilities, as well as recognition and distribution of benefits and costs. Through the fairness principle, Lockwood et al. (2010) suggest the natural resource arrangement would be more equitable, particularly in power distribution, recognition of the diverse of values, and the treatment of the participants, not only for current conditions but also for the future. This research employs definition of fairness by Lockwood et al. (2010).

The principles of fairness should be implemented to develop the action and mechanism of decision-making related to sharing benefits, costs, and responsibilities (Davidson et al., 2006). In Thibaut and Walker's theory related to justice (1975) it is emphasized that a key principle by which people examine the fairness of a process is through direct participation in the decision-making process by giving a voice or opinion (Lind and Tyler, 1988). Lockwood (2010) suggests participation is an appropriate mechanism for governance of natural resources to assist fairness. The mechanisms implemented by supporting and treating the stakeholders with respect and dignity; and moreover, the government should guarantee that the procedures or mechanisms in decision-making are relevant and not influenced by any issues related to race, ethnicity, gender, or status of the person (socio-economic) (Lockwood, 2010). In addition, Leventhal et al. (1980) proposed six more principles for procedural fairness which are consistency (over people and time), objective (by suppressing personal interests), accuracy (in using and giving information), adaptable decision, concerning all representative recipients, and concerning ethical (standard moral) prevailing in the community.

To conclude, fairness is one of the important governance principles that should be implemented to develop action and mechanisms of decision-making related to sharing benefits, costs, and responsibilities. Analysis of fairness should cover consistency in decision making and equity of responsibility, recognition, and distribution or sharing of benefits and costs. These consider the roles and interests of all interest of stakeholders involved in natural resource (mangrove) management.

2.6.6 Integration

The principle of integration is also important in the governance system. Lockwood et al. (2010) refer to the integration of the connection and coordination between governance at the

same level and across governance levels. Dovers (2005) suggests that in considering the interconnected nature of sustainability challenges in the management of natural resources, the governance instruments require connectivity that is functional in connecting the government at different scales, regions, as well as sectors of policies. Lockwood et al. (2010) find that such connectivity is necessary to recognize the interdependency between people and the issue of natural resource management, and further, it allowed actors to address the shared problems. However, Lockwood et al. (2010) emphasize that connectivity requires an institutional arrangement that enables them to link the separate resource management institutions' processes (formal and informal) both vertically and horizontally.

To analyze governance principles of integration, Nunan (2018) identifies key points to ensure it is more focused, such as the existence of coordination between and within the level of governance, the flow of information and resources, as well as the fitness of priorities, plan, and activities between and within governance.

It can be concluded that integration is important to connect and coordinate government actors between governance at the same level and across governance levels. However, such connectivity requires institutional arrangements that enable the linking of the separate resource management institutions' processes (formal and informal) both vertically and horizontally.

2.6.7 Capability

The next principle is capability which Lockwood et al. (2010) refer to as key resources such as plans, resources, skills, access, knowledge, experience, and leadership that are sufficient to the organization. Lockwood et al. (2010) suggest capability represents the recognition that new challenges problem usually require particular attention appropriate to the existing of human resources, institutions, and organizations. Berkes et al. (2000) underline that knowledge becomes the important key component to be capable of generating solutions to complex problems that are characterized by multi-dimensionality, uncertainty, time consumption, and diversity in values. Meanwhile, Lawrence (2005) believes that in natural resource management, the capability of governance bodies to deliver the expected outcome

is affected by responsibilities. Lack of responsibility may put the governance become insufficient.

2.6.8 Adaptability

Adaptability, the final government principle included in this review, is considered to have connectivity with the capability principle. Plummer et al. (2012) argue that adaptability is an important feature in natural resource governance, particularly under the conditions of change, uncertainty, and complexity that mark natural resources (Armitage et al.2007). Adaptability is defined as capacity of an organization to gradually adjust its strategy and competencies in response to environmental changes (Albaum & Tse, 2001; Katsikeas, Samiee, and Theodosiou, 2006). Lockwood et al. (2010) define adaptability as the acknowledgement that natural resource governance occurs in an uncertain and unpredictable environment. Lockwood et al. (2010) contend that to operate effectively, the governing authorities should be capable of anticipating and responding to all opportunities, threats, and risks. Several key points are suggested in order to the adaptability principle of governance (Nunan, 2018; Lockwood et al., 2010), such as the way governance structures seek and respond to innovation (new knowledge), governance efforts to cope with uncertainty, and the capability of individuals and structures to reflect and learn from governance performance.

2.7 Conflict within natural resources management

As already observed, mangrove governance is conducted through different arrangements practiced in different ways by multiple actors. The arrangements and the way the actors work need to be analyzed by utilizing governance principles (promoted by Lockwood et al., 2010). Some of the governance arrangements are prone to lead to differences of opinion or perception which lead to conflict. Several aspects related to conflict such as the source of conflict, actors responsible for conflict to happen, mechanism took by actors to resolve conflict, and whether the conflict is solved in a transparent way are reviewed in this section.

Conflicts or disputes over natural resources such as forests, water, land, conservation, and wildlife occur on all levels. For example, neighbours arguing over a hedge representing the

individual level, to neighbouring countries disagreeing about the sharing of a transboundary water resource on the international front (Oli Brown and Michael Keating, 2015). This is because people everywhere compete for natural resources to fulfill their needs to sustain their livelihoods (Buckles &, Rusnak, 1999). Wood (1993) finds that there is a strong link between natural resource utilization, natural resource competition, and conflicts.

A conflict is defined as a situation in which actors (can be individuals or groups) that interact feel impairment because of other actors actions, and those feelings arise due to differences in their way of thinking, goals, and perceptions (Marfo and Schanz, 2009). Mostly, conflict arises when various groups believe their interests are incompatible with each other. It can also occur in situations when different interest groups use resources in the same location, or when there is a lack of natural resources that leads to competition and resulting conflict amongst the various user groups (Mbaiwa, 1999). In addition, state actions, as well as policies related to natural resources implemented, may sometimes give rise to conflicts.

Furthermore, over-control and security of natural resources, or the opposite condition when there is lack of control and security, both can prevent appropriate management of resources, increase competition, and dissatisfaction; they can also worsen conflict and resource utilization that is unsustainable (Darkoh & Mbaiwa, 2001). Another important aspect contributing to conflict is when multiple actors are involved in resource use and management with diverse interests, perceptions, values, and claims, along with several dimensions such as causes, social and ecological impacts, and approaches to management (Castro and Nielsen, 2003)

The term ‘conflict’ is often considered to have a negative connotation and is mostly associated with violence, a situation where there is no cooperation and peace, rather it is full of threats of violence, disruption, or disputes (Warner, 2000). A conflict can become problematic when societal mechanisms and institutions responsible for managing and resolving conflict break down, giving way to violence (Brown O. and Keating M., 2015). In contrast, Idrissou et al. (2011) argue that conflicts are not only dramatic confrontations that attract public attention but that hidden or silent conflicts are often embedded in routine activities. Moreover, conflicts might not always be problematic, but can spur positive social change and generate new ideas and incentives for natural resource management (Hafner et

al., 2003; Gómez-Vázquez et al., 2009). A managed conflict transparently to achieve understanding and cooperation, can be a positive force for change; in contrast when a conflict is not solved or ignored, it may escalate and become destructive.

There is increasing evidence in several case studies where conflicts have yielded positive transformation and change in terms of improving equity and justice among forest users (see cases in Doornbos et. al., 2000; Castro and Nielsen, 2003). Thus, conflict, in general, can be perceived also as a means of social learning in which predominant practice or current situation can contend and new lessons for improvement proposed (Hirschman, 1994; Burgess and Burgess, 1996). In that sense, natural resource conflicts can be perceived as having both positive and negative capabilities, a notion that has in recent decades contested the conflict avoidance and belligerent schools of thought suggesting a conflict capability paradigm (Glasl, 1999).

Conflict may vary in terms of level, dimension, and intensity, from confusion to frustration or even to violent clashes between actors who have an interest in the resource, particularly when the cause of conflict is poorly communicated (Kant and Cooke, 1999). In terms of levels, conflicts are categorized to occur at micro (micro-micro) or macro (macro-macro) levels (Grimble and Wellard, 1997). Further, Grimble and Wellard (1997) explain that micro-level conflict can occur among community groups and individuals, the private sector, civil society organizations, or between government and community groups. Conroy et al. (1998) give examples of micro-micro conflicts, such as within forest user group, within ecotourism board management/association and that occur between these two types of groups with other actors that are not directly involved in the management of the association. An example of the latter is between a forest user group and local women entering the forest to collect wood for fuel.

Apart from at the levels, conflict within natural resources is also described as a social value and interpersonal issue that refers to goal disturbance. Social value conflict is explained as a conflict that occurs between various groups with different interests even without direct physical contact between the groups (Vaske, Needham, and Cline, 2007). On the other hand, interpersonal conflict is described as a conflict that occurs with the behaviour or physical

presence of the group interferes with goals, expectations, and behaviour of another group (Jacob and Schreyer, 1980).

However, natural resource management conflict can include differences in social values and goal interference from incompatible activities in the same location. Common triggers for conflict include new infrastructure development, changes in the built environment (e.g. tourism development), and resource extraction.

2.7.1 Conflict management and resolution

In the context of conflicts within natural resource management, complex issues often occur in natural resource conflicts that mostly cannot be resolved completely. For that reason, there is a terminology for conflict management rather than conflict resolution (Delli-Priscoli, 1997). Daniels and Walker (1997) underline those conflicts within natural resources are not only inevitable and unavoidable but also desirable to the extent that it can lead to negotiation and innovative agreements among stakeholders. Thus, the tendency for conflict management in natural resource conflicts is for conflicts to be regulated within time limits rather than resolution of it. For example, in forestry, one continually encounters in sustainable forest management literature that, given the complexity and conflicting perspectives on interests and values related to forest use, the suggested alternative way is to create an integrated approach to forest management (Daniels and Walker, 1997).

Conflict management has an optimal goal which is to avoid recurrence. However, conflict management is rarely successful with a single-step process, unless the conflicts are minor in scale and goodwill or the actors involved prevail (Blas Mola-Yudego and David Gritten, 2010). The best outcome for conflict management in short term is communication between actors involved in a conflict to reduce tensions and increase understanding while hoping for positive signs to move forward to resolution (Agerbak, 1991). When parties have an interest in seeking solutions, the chance for resolution of the conflict is greater (Agerback, 1991). Even so, Cousins (1996) argues that all major stakeholders should be included in the process of resolution in a bid to find a win-win solution. Most important of all is that the process should be transparent.

Three general procedures are suggested to be followed to solve conflict (Ayling and Kelly, 1997). The first is collaborative planning; that is the stakeholders involved in conflict agree to collaborate or work together to find a solution. One of the important dimensions to improving integration is determining a way to bring together the various stakeholders with different interests in planning and implementing sustainable resource management (Brown, 1995). This can be implemented by forming a desire embodied in concepts of collaboration and co-management between stakeholders (Buckles and Rusnak, 1999; Borrini-Feyerabend et al., 2000). However, these suggested concepts of collaboration and co-management mean increased complexity due to the increasing number of stakeholders involved in co-operation (Ayling and Kelly, 1997). Regardless of these aims, conventional approaches in natural resource management do not always achieve their target in regulating conflicts within an expected time (Buckles, 1999) as evidenced by several case studies related to conflict management (Buckles, 1999; Nielsen and Castro, 2003; Wittmer et al., 2006). Consequently, innovation is needed for successfully implemented conflict regulation (Buckles and Chevalier, 1999).

The second aspect is negotiation, in which parties meet face-to-face to solve the problems. Burton and Dukes (1990) underline that a neutral third party is needed for disputes that can be resolved through communication to ensure the meetings are open, transparent, and productive. In addition, Burton and Dukes (1990) suggest the use of a formal meeting – for example, a problem-solving workshop – to attempt to shift individual self-interest to the more basic needs of the larger constituency.

The third procedure is mediation as a more formal process similar to negotiation. Mediation is usually necessary for disputes where positions remain inflexible. Through this procedure, a neutral third party is given to give power to directly intervene and make recommendations or, in the case of arbitration, to make a binding or advisory decision. Mediation has become common to resolve resource-related disputes (Ayling and Kelly, 1997).

Another emerging key dimension to be considered in natural resource conflict and management is ‘power’ (Castro and Nielson, 2003). Bunier (2010) defines power as a political phenomenon that is utilized to cut across all the dimensions of governance, social-political, and human social-economic endeavours. In the case of conflict, it is important to

understand how the power is played out in specific conflict contexts is an important dimension of the conflict management problem (Buckles and Rusnak, 1999; Castro and Nielsen, 2003). This is related to contested issues of mutual interest that power relations manifest themselves, and natural resource use and management often involve such contested issues, such as who has rights of access, use, and control, when and under what conditions, etc. (Jacobsen and Cohen, 1986).

In addition, another important dimension of natural resource management and conflict management is the existence of spatial and cross-scale linkages between actors in conduct interactions (Wilson et al., 2005; Louis et al., 2005). This is related to the recognized fact that natural resource ecosystem goods and services bring value to national and global society (Dietz et al. 2003). There is a recognition that 'institutions at all levels, from resource users to international organizations utilize cross-scale linkages to further their own interests and agendas within their management systems, whether they are dominant or are simply resisting change' (Adger et al. 2005:8). In this regard, Louis et al. (2005:2) argue that 'power is reflected in and reproduced by the capacity to control and capture resources from different levels.'

In summation, conflict within natural resources can happen at different levels and involve various actors that have various interests in natural resources. In terms of natural resource conflict, complex issues are often found in natural resource conflicts that mostly cannot be resolved completely, and for those reasons, the actors involved prefer to manage the conflict (conflict management) rather than resolve the conflict. The management conflict can be conducted through forming a desire embodied in concepts of collaboration and co-management between stakeholders. Several key dimensions in conflict management are considered 'power', how the power is played out in specific conflict contexts is an important dimension to the conflict management problem, as well as spatial and cross-scale linkages between actors in conduct interactions. Collaboration, negotiation, and mediation are three procedures suggested to conflict management and resolution.

2.7.2 Forest related conflict

Conflict or dispute is common in forest governance and management, and it occurs at different levels, dimensions, and intensities (Eckerberg and Sandstrom, 2013). Forest conflicts naturally affect many areas of forests because their management results in numerous types of disputes (Daniels and Walker, 1997). Forest conflicts have an obvious geographical component, as they do not appear randomly (Yasmi et al., 2006). Their distribution is likely not only based just on forest area but also related to the social and political context. McDermott et al. (2010) attribute the reasons behind forest conflicts to the fact that forest governance and management have multi-objective, combined with the many stakeholders involved with various competing interests.

However, Ibarra and Hirakuri (2007) suggest that many problems that trigger the conflicts related to local institutions that are weak and disorganized, along with formal and informal sets of rules and practices. It is noted that institutional conflict tends to arise when formal and informal goals are contradictory and the government is unable to maintain stable provisions, particularly when the conflict is related to property rights (Ibarra and Hirakuri (2007). Apart from the multi-objective of forest governance and local institutions, stakeholder involvement is another key important in forest conflict. This is associated with the procedure of stakeholder involvement underlining the sensitive issue of who can participate in forest management (Eckerberg and Sandstrom, 2013).

2.8 Conclusion

The literature review concludes that the uniqueness of mangrove ecosystems requires the involvement of various actors (government and non-government) in management that occurs at different administrative levels, including regional and national levels. This, -and particularly happens in countries with a decentralization system. The existence of multiplicities in actors, institutions, and administrative levels in natural resource management indicates that the governance is under a multi-level governance arrangement. It is believed that decentralization in natural resources is one of the key strategies for encouraging sustainable management. Thus, the various government actors involved are expected to can strengthen and support the mangrove management that is held by local

institutions, enforcing rules and regulations related to the benefits of resources as well as acting as a mediator whenever there is conflict related to the natural resource. However, the research argued that the natural resource management sector in the decentralization system remains poor and instead often causes confusion among actors involved in resource management.

The various actors involved in governance have caused several issues related to interaction (vertical and horizontal), coordination, and overlapping of authorities. The existence of horizontal interactions facilitates cooperation and coordination between actors at any level, whilst vertical interactions facilitate the flow of resources, information, and decisions up and down throughout the system. Regarding coordination, there is a "coordination dilemma" as the result of the lack of policy to regulate the frequency of interaction and coordination between actors. The coordination in multi-level governance often faces problems, particularly in the decision-making process. It is a common occurrence that the actors involved in the interactions prefer to bypass intermediate levels reflecting networks that form as actors seek alliances and solutions to complex problems of governing ecosystems. Nevertheless, the arrangement in network and polycentric governance can explain more regarding the coordination problem in multi-level governance of natural resources.

In addition, the involvement of multiple actors and interactions that happen at different levels in multi-level governance of natural resources contribute to challenges tied to the conduct of government. This is related to the diversity and range of actors and interactions that often make responsibilities among actors become unclear; for example, who should be responsible for decision making and reporting. Government performance is noted to be influenced by several key components, known as 'governance principles'. These include legitimacy, transparency, accountability, inclusiveness (including participation and representation), integration, fairness, capability, and adaptability. Such principles in the governance system along with multi-level governance arrangements are important to analyze and identify the way government is arranged and working, to sustain the natural resource, and livelihood, as well as to solve any existing conflict-related natural resources.

Meanwhile, different arrangements practiced by various actors involved in mangrove governance are potential to trigger conflicts. Complex issues are found in natural resource

conflicts that mostly cannot be resolved completely, and for those reasons, the actors involved prefer to manage the conflict rather than resolve the conflict. Management conflict can be conducted through forming a desire embodied in concepts of collaboration and co-management between stakeholders. Key dimensions in conflict management are considered 'power', conflict management, and spatial and cross-scale linkages between actors in conduct interactions. Three procedures suggested for conflict management and resolution are collaboration, negotiation, and mediation.

2.9 Analytical framework

The multiple-governance system along with critical component of governance principles suggested how the institutional, actors and levels in multi-level governance arrangement can be identified and understood (Nunan, 2018). Thus, Nunan (2018) formulated the guide to seek and analyze key aspects in the multi-level governance system effectively, particularly in natural resource management. The guide is presented in figure 1 below:

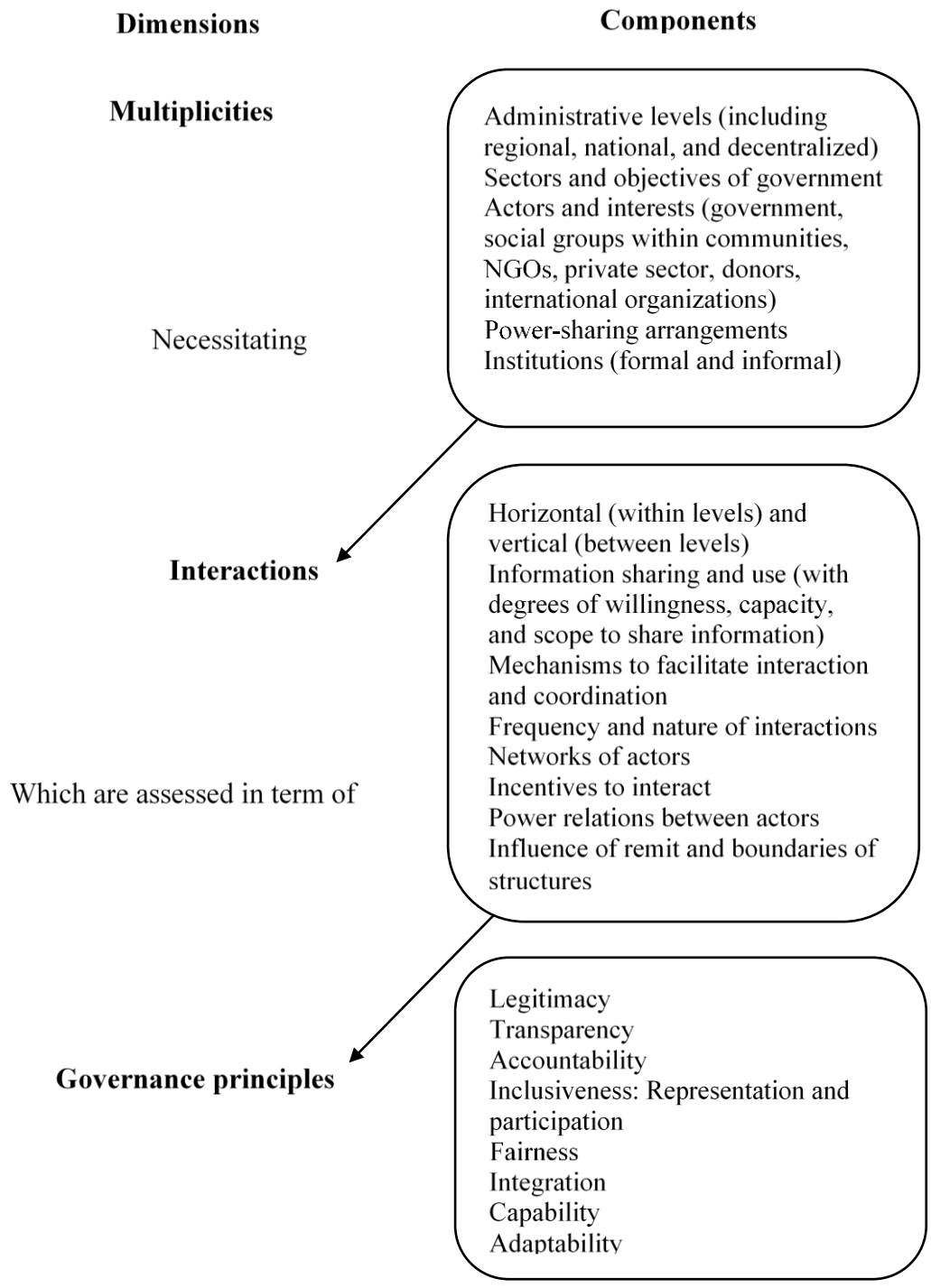

Figure 1. "Guide for analysing multi-level governance of natural resources". Source: Nunan, 2018:p.162

The guide includes some aspects of analyzing governance in natural resources which are the key characteristics of multi-level governance, along with the challenges in the governance that are important to facilitate the analysis of the landscape of multi-level governance (Nunan, 2018: 162). There are three areas are that highlighted in the guide, name: (1) Multiplicities of levels, actors, and institutions; (2) The existence of interactions and challenges (both vertical and horizontal); and (3) Governance performance assessment through the application of governance principles. Therefore, the guide is suitable to be adapted to develop a conceptual framework to analyze the research and answer the research questions. The conceptual framework (Figure 2.) is as follows:

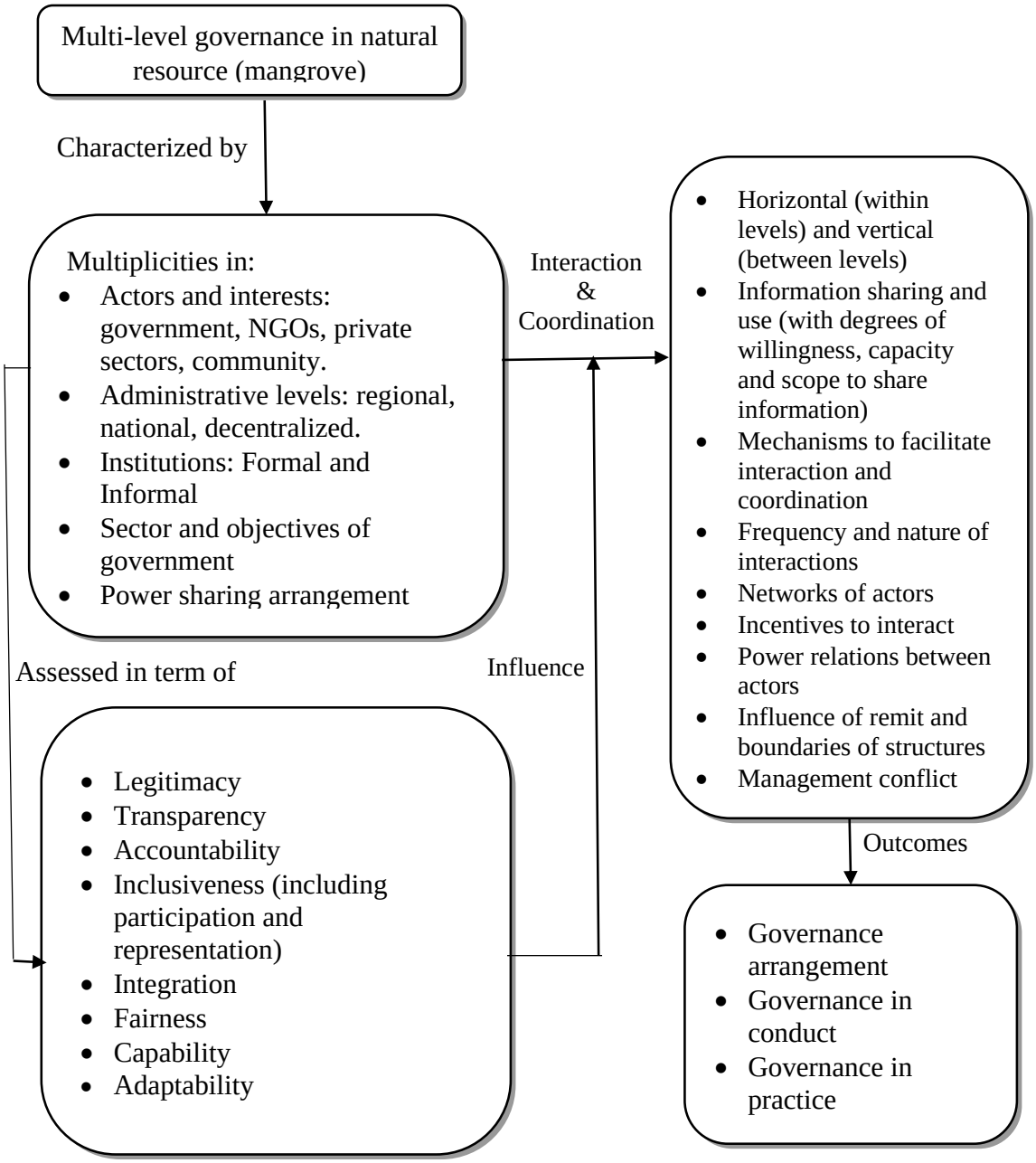

Figure 2. A conceptual framework for analysing multi-level governance of natural resource management. Developed from the "Guide for analysing multi-level governance of natural resources" (Nunan, 2018: p.162).

The framework explains how mangrove governance works in mangrove management. It starts by explaining characteristic mangrove governance that includes the multiplicities in actors and interests, administrative levels, institutions, sectors, and objectives of government, as well as the power-sharing arrangement. All the characteristics are assessed in terms of governance principles that include legitimacy, transparency, accountability, inclusiveness (including participation and representation), integration, fairness, capability, and adaptability. Lockwood et al.'s (2010) set of governance principles as used by Nunan (2018) are also used in the adapted framework, in recognition that they are not used normatively, with expectations of how governance should be practiced, but rather as a guide to probe and inform investigation of how governance is working and delivering in practice. The multiplicities of actors and interests in mangrove governance create interaction and coordination. Several aspects are analyzed in interaction and coordination, such as horizontal (within levels) and vertical (between levels), information sharing and use (with degrees of willingness, capacity, and scope to share information), mechanisms to facilitate interaction and coordination, frequency and nature of interactions, networks of actors, incentives to interact, power relations between actors, influence of remit and boundaries of structures. Ultimately, in the end, the aim of analysis is to achieve objectives which are natural resource sustainability, livelihood sustainability, and conflict resolution.

CHAPTER 3

RESEARCH BACKGROUND

3.1 Introduction

The previous chapter reviewed literatures on mangrove governance includes multi-level governance system, decentralisation of natural resource management, governance principles and conflict within natural resource management to identify the key aspects of mangrove governance practice and conduct. This chapter extends the analysis by explaining why mangrove governance in Indonesia and particularly in Lampung province as the case study locations is important to analyse.

Information on mangroves is identified in this chapter, including the mangrove overview, condition of mangrove generally in world and particularly in Indonesia, how mangroves are managed, what type of arrangement on mangroves, and actors involved in mangrove management. The thesis is also provided information relates to the condition of the case study locations.

3.2 Mangrove Forest

Mangroves are trees and shrubs that ecosystems interface between land and sea (Alongi, 2002). As a unique and complex ecosystem, the ecosystem is known as productive and rich in biodiversity, and adapted to harsh coastal areas (Alongi, 2002; Giri et al., 2011). Based on data from ITTO (2012), mangroves have 73 species in total, however, the species composition of mangrove forests is varied in each continent (FAO, 2007).

Mangroves provide a wide range of goods and services utilized for socioeconomic and environmental functions (Priyanto, 2012). The services are including coastal protection against waves, water currents, and strong winds, conservation for various animals, and

habitat for variety of fish; and the goods are including timber and non-timber forest products (FAO, 2007). Total mangrove forests areas in the world are estimated at 152,360 km2, distributed within different countries and territories (ITTO, 2012). Giri et al. (2011) mentioned that more than forty one percent (41%) of mangroves are found in Asia, and the rest are spread in Africa, and America (North, South and Central), and Oceania. According to the World Atlas of Mangroves, five countries with largest mangroves areas are Indonesia (21 percent of global total), Brazil (9 percent), Australia, Mexico, and Nigeria with 5 until 7 percent mangroves (Spalding, Kainuma & Collins, 2010).

3.2.1 Mangrove forests in Indonesia

Indonesia with the most extensive mangrove forests in the world is in South-East Asia (Giesen et al., 2007). The mangrove forests across coastal areas in Indonesia have functioned as protection forests for the coastal zone through the issuance of President Decree Number 32/1990 (Kusmana, 20110). According to the Centre Survey of Maritime Natural Resources, almost every province in Indonesia has mangrove forests, with the largest in Papua for about 1.634.003,454 ha, whilst the smallest is in Jakarta for about 500.675 ha (Hartini et al., 2010). In total, mangrove vegetated area in Indonesia is 3.2 million ha, but the potential area for mangroves to grow is wider according to the Ministry of Forestry, that estimated to reach 7.8 million ha (Kusmana, 2011).

Mangrove ecosystems in Indonesia are under diverse conditions between good (30.7%), moderately -, (27.4%) and heavily destroyed (41.9%), with the rate of deforestation reach 52,000 ha yr-1 (FOA, 2007; Kusmana, 2011). Deforestation cause mangrove lose., that in the 1970s, the lost have dramatically increased when the exploitation activities shifted from Java Island to new areas outside the island. Armitage (2002) identifies that the loss of mangroves due to deforestation is varied between 45 percent (in one decade) happened in East Kalimantan, and 70 percent loss (in 15 years) happened in Central Sulawesi. Meanwhile, the loss of mangroves that happened in Java and Sumatra Island by the end of the 1960s was estimated more than 200,000 ha. Various factors caused rapid decline of mangrove forests including conversion activity for aquaculture, agriculture, and urban development (Alongi, 2002; Giri et al., 2008; Murdiyarso et al., 2015).

The loss of mangrove coverage in Indonesia become problematic because this country provides approximately 23% of the world‘s mangrove forest (Murdiyarso et al., 2015). Furthermore, mangrove loss in Indonesia is responsible for almost half of all global mangrove deforestation happen in the 21st Century. In addition, deforestation is argued can cause another challenge of climate change. Therefore, Indonesia government committed to reduce the deforestation (Giri et al., 2008; Murdiyarso et al., 2015). Total mangrove area in Indonesia can be seen on Table 1 below:

Table 1. Mangrove vegetated and potential area in Indonesia

No.	Province	Area of Mangrove (Ha)	
		Bakosurtanal 2009	RLPS-MOF 2007
1	Nangroe Aceh Darussalam	22,950,321	422,703,000
2	North Sumatra	50,369,793	364,581,150
3	Bengkulu	2,321,870	-
4	Jambi	12,528,323	52,566,880
5	Riau	206,292,642	261,285,327
6	Kepulauan Riau	54,681,915	178,417,549
7	West Sumatra	30,002,689	61,534
8	Bangka Belitung	64,567,396	273,692,820
9	South Sumatra	149,707,431	1,693,112,110
10	Lampung	10,533,676	866,149,000
11	DKI Jakarta	500,675	25,930
12	Banten	2,936,188	1,180,484
13	West Java	7,932,953	13,883,195
14	Central Java	4,857,939	50,690,000
15	East Java	18,253,871	272,230,300
16	D.I.Yogyakarta	-	-
17	Bali	1,925,046	2,215,500
18	West Nusa Tenggara	11,921,179	18,356,880
19	East Nusa Tenggara	20,678,450	40,640,850
20	West Kalimantan	149,344,189	342,600,120
21	Central Kalimantan	68,132,451	30,497,710
22	South Kalimantan	56,552,064	116,824,000
23	East Kalimantan	364,254,989	883,379,000
24	North Sulawesi	7,348,676	32,384,490
25	Gorontalo	12,315,465	32,934,620
26	Central Sulawesi	67,320,130	29,621,560
27	South Sulawesi	12,821,497	28,978,300
28	South East Sulawesi	44,030,338	74,348,820
29	West Sulawesi	3,182,201	3,000,000
30	North Maluku	39,659,729	43,887,000
31	Maluku	139,090,920	128,035,000
32, 33	Papua and West Papua	1,634,003,454	1,438,421,000
	Total	3,244,018,460	7,758,410,595

Source: Centre for Marine Natural Resources, Agency of Survey Coordination and National Mapping, Republic of Indonesia (Bakosurtanal) (2009)

3.2.2 Mangrove Management in Indonesia

Regarding the importance of mangroves, Indonesia government for over two decades has introduced interventions to control deforestation of mangrove ecosystem. These are including the declaration of coastal areas as greenbelts and protection areas, regulating goods and services taken from mangroves, and provision of mangrove tree seedlings for rehabilitation and restoration programs. (Wibisono & Suryadiputra, 2006).

Government efforts become more intense following the tsunami disaster that hit part of Sumatra in 2004, which sharpen the role and function of mangroves in protecting coastal areas (Banjade et al., 2017). To accelerate the result, the government conducts various activities of rehabilitation and restoration. In addition, to improve the success of the activity, the government have also increased community understanding relates the important of biophysical aspects of mangroves (Wibisono & Suryadiputra, 2006; Banjdae et. al., 2017). This was followed by the development of institutions that focus on mangroves namely: first, "Mangrove Forests Management Bureau" (Balai Pengelolaan Hutan Mangrove or BPHM) in 2007. This bureau has two branches: BPHM Region I in Denpasar, Bali which management authority on mangrove forests located in Java, Bali, Madura, Nusa Tenggara, Sulawesi, Maluku, and Papua; and BPHM Region II in Medan, which working areas to manage include mangrove forests in Sumatra and Kalimantan. The second institution established is "National Mangroves Working Group" consists of multi-sectoral institutions and NGOs; and the third is "Local Mangrove Working Group" that work area in provincial and district levels (Kusmana, 2011).

The intervention of government on mangroves was continued and strengthen by the creation of the "National Strategy on Mangroves Ecosystem Management" in 2012 through the issuance of President Decree No. 73/2012 (Kusmana, 20122). The national strategy aims to facilitate coordination across sectoral between actors involved in mangroves management (Banjade et. al., 2017). Hence, through the national strategy, various government institutions involved in mangroves management. However, according to Soemodihardjo & Soerianegara (1989) and Kusmana (2014), this involvement of various actors has practiced more than a decade in mangroves governance in Indonesia.

There are at least five ministries recognized to have responsible authority in managing and determining mangrove forests resources allocation both directly and indirectly, including the 'Ministry of Forestry, the Ministry of Maritime Affairs and Fisheries, the Ministry of Home Affairs, the National Land Bureau (BPN), and the Ministry of Life Environment' (Kusmana, 2011). Major authority is under the Ministry of Forestry (currently it is the Ministry of Environment and Forestry), while the other ministries have sectoral authorities such as: "Ministry of Maritime Affairs and Fisheries" concerns related to significant contribution of mangroves to the coastal fishery; "Ministry of Home Affairs and BPN" involves in agrarian or land use; and "Ministry of Life Environment" concerns on the well-being of the environment as a whole (Kusmana, 2011).

As a result of government efforts, a decade after the tsunami disaster (2014), the government has successfully planted mangroves up to 4.9 million trees (Banjade et al., 2017). Several management activities are identified in mangrove management practice such as mangroves protection and conservation, mangroves ecosystem management strategy, and mangrove rehabilitation for afforestation and or reforestation. Those activities regulate based on three different regulations such as Presidential Decree No. 32/1990', Presidential Decree No. 73/2012, and Presidential Decree No.121/2012 (Sunyowati et al., 2016). Meanwhile, rehabilitation program to achieve sustainability of mangrove is implemented through several strategies, for example, familiarizing mangrove functions including conservation and rehabilitation program, and collecting fund from any resources (Sunyowati et. al., 2016).

Meanwhile, various government efforts have been recognized to implement mangrove management such as (1) conducting mangrove activities, particularly in degraded coastal areas which activities are including fish breeding, planting and replanting mangrove tree seedlings, mangrove maintenance, and utilization mangrove forest. To conduct these activities, the government involved participation of local community; (2) rearrange the spatial of coastal zones for different purposes, including residential, vegetation, and ecotourism; (3) increased community initiatives and awareness to sustain mangroves and benefit mangroves responsibly. This is conducted by increasing community knowledge and application relates to conservation and the important of mangroves; (4) integrating coastal management to increase revenue of local community; (5) communicating and familiarizing all programs relates to mangroves including the implementation of law enforcement; (6)

protecting the coastal area through empowering local community; (7) implement management programs that involved local community to improve ecosystem sustainability and community welfare (Kusmana et al., 2014; Sunyowati et al., 2016).

Regarding regulations, previously mentioned above that activity on mangrove management carry out by government actors have different regulations as the legal basis for the implementation. Sunyowati et al. (2016) note several regulations in the implementation of mangroves management is based on Law No.26/2006 related to coastal spatial management, whilst for the integrated coastal and small island management is based on Law No.27/2007. Both regulations are similar, and the difference is only related to scale of management area: Law no.27/2007 limited scope is coastal zone and small islands. Both regulations can cause confusion and trigger a conflict between the public and business (Sunyowati et al., 2016). Three other regulations relates to mangroves management are: 1) President Decree No.32/1990 on management of protection to regulate mangrove forest as protected area and arranging coastal line; 2) Presidential Decree No.121/2012 relates to coastal rehabilitation that includes some criteria of ecosystem damage of phase of rehabilitation, participating, monitoring and funding for rehabilitation activities; 3) Presidential Decree No.73/2012 on 'Strategy of mangrove ecosystem management' consists of different policies and programs as an integrated part of national development planning system aims to achieve the sustainable development of mangrove ecosystems and community welfare. The government realize that many interests in mangroves, therefore, it creates 'mangrove working group' to accommodate the urgency of various interests (Sunyowati et al., 2016).

Mangroves across coastal landscape in Indonesia involved management at different levels of national, provincial, and district levels and involved different institutions and arrangements (Sunyowati et al., 2016). At lower levels, several government institutions get mandate to manage mangroves from the government at higher level. The decentralise policy adopts by government allow a transfer power from higher level to lower levels (Ribot, 2004). However, it is argued that at lower levels, the transfer of power has caused confusion. Moreover, the issuance of various regulations to govern the involvement of actors has cause overlapping authorities and regulations in mangrove management in Indonesia (Banjade et al., 2017).

In addition to multiple administrative levels, the ecosystems are managed under multiple tenure arrangements include protected area (state forests), joint management, and customary management (Banjade et al., 2017). However, there has been little study to distinguish types of tenure arrangement on mangroves and it impact to mangrove management. Nevertheless, Oudenhoven et al. (2015) suggest that different types of mangrove management arrangement can contribute to a range of ecosystem services, by considering the multifunctionality of mangrove forests into coastal management arrangement.

3.3 Mangrove in Lampung Province

Lampung is a province in Indonesia in the southern tip of the Sumatra Island, with Bandar Lampung as the capital city. It has a relatively large coverage of mangroves for 896 km in total length of the coastal 1.105 km, or about 81 percent of Lampung coastal zone (Priyanto, 2012). The forests provide various goods and services that contribute both for ecosystem and livelihoods, including prevent eruption, seawater intrusion, diversity of aquatic and non-aquatic biota, etc.

However, Priyanto (2012) explains that economic activities conduct at the forests have made many areas of mangroves in Lampung degraded, for example charcoal production and conversion to shrimp ponds. Moreover, in order to accelerate economic growth from this sector, the government encouraged investors and private companies to develop more shrimp ponds. The massive conversions have made shrimp and fish as Indonesia's main exports (Ilman et al., 2016; Kusworo, 2014). Yet, this situation has made degradation of mangrove areas for almost 48 percent of total mangrove coverage in Lampung (Watala, 2012).

Mangrove forests in Lampung Province are managed by different actors, with different arrangements in practice and tenure including state forests, national park, other land use areas under local government territory, large-scale concessions, and community-governed territory (Banjade et. al., 2017). This research takes case studies on mangroves from different coastal areas in Lampung province: three villages in East Lampung district include Margasari-, Sriminosari-, and Karya Makmur village; and two others are in Pesawaran district, including Pahwang Island, Gebang, and Sidodadi village. Mangrove forests in these villages are mostly located in other land use areas under local government authority; except

mangroves in Karya Makmur village under state authority (state forests), and Pahawang island which is community governed. Even though mangroves are under government authority, actors who implement management are. For example, in Margasari village, the mangroves are managed by the University of Lampung, and in Pahawang Island the NGO is found to be dominant in mangrove management (Banjade et. al., 2017).

Below is the Table of information related to the width of mangrove forests area and their conditions in Lampung province:

Table 2. Mangrove forests area in Lampung province

No.	Recency/City	Current width	Potential mangrove area	Width
		Ha	Ha	Ha
1	City of Bandar Lampung	62.10	-	62.10
2	Metro city	-	-	-
3	West Lampung Regency	111.39	-	111.39
4	South Lampung Regency	1,875.87	94.65	1,970.52
5	East Lampung Regency	2,418.00	3,447.71	5,868.71
6	Central Lampung Regency	-	-	-
7	North Lampung Regency	-	-	-
8	Mesuji Regency	-	-	-
9	Pesawaran Regency	838.65	1,200.00	2,083.65
10	Pringsewu Regency	-	-	-
11	Tanggamus Regency	429.27	-	429.27
12	Tulang Bawang Regency	4,268.27	80.22	4,348.49
13	West Tulang Bawang Regency	-	-	-
14	Way Kanan Regency	-	-	-
	Total	10,003.55	4,822.58	14,826.13

Source: Directorate Forest and Land Rehabilitation, Ministry of Forestry, 2014.

Table 3. The width and condition of mangrove forests coverage in Lampung Province

Condition of the natural resource	2010	2011	2012	2013	2014	2015
Coverage (Ha)	19.596	22.724	21.644	2.537	2.537	17.11
Good condition (%)	-	21	53	66	66	29
Bad condition (%)	-	13	11	19	19	18
Worse condition (%)	-	66	36	15	12	54
Unidentified (%)	-	0	0	0	0	-

Source: Statistical Bureau of Indonesia, 2017.

Mangrove forest in East Lampung district

The research selects locations with cases on mangroves. The importance of location selection is to find out the details of objects analyzed in this thesis, including multiple administrative levels, actors, and arrangements on mangroves. Two districts in Lampung province were selected including East Lampung and Pesawaran districts, with ground reason of having mangroves in large coverage located in these districts along with various arrangements practiced by different involvement of actors.

East Lampung district has the largest mangrove in Lampung province, with approximately 60 percent of total mangrove in Lampung province. The largest mangrove forest coverage in East Lampung district is in Margasari and Srimonosari villages. Both villages experienced the conversion and deforestation of their mangrove area. Prior research found that mangrove forests in Margasari village experienced three periods of loss (Kustanti, 2014).

In the first periods during 1977-1990, the characteristic of mangroves in this area as open access has made many actors benefitted and exploited the area and cause degradation. This was mostly conversion to shrimp ponds. In addition, the village leader allowed the conversion to happen (Kustanti, 2014); in the second period (1990-1994), the degradation caused flood and destroyed all the shrimp ponds and mangrove forests along the coastal. Twelve sub-villages near the coastal area disappeared; the third period (1995) was rehabilitation, conducted by doing rehabilitation programs through mangrove planting activities. According to Kustanti (2014), the rehabilitation program carried out until 2004, and it was succeeded to grow new mangrove forests for about 700 ha. Later, the management of the forests is delegated to the University of Lampung through the issuance of "Decree No. 170.07.02.2008/143/2005 relates to support for integrated mangroves management to the University of Lampung" and "District Leader decree No. B. 303/22/SK/2005" on ―Determination of locations for mangrove forest management in the context of education, environmental conservation, and community empowerment covering an area of 700 Ha in Margasari village, Labuhan Maringgai District". Krott (2005) suggests that by employing expertise in forest management, the sustainability of the forest for the common welfare is easier to achieve.

The livelihoods in Margasari village (1,700 people in the population) are coastal ecosystem dependents, as most of them work as fishermen. However, only a few people benefit from mangrove trees for the leaves and fruits. According to Qurniaty et. al (2016), local community is prohibited from taking goods from mangrove trees, particularly the timbers. In reality, the local community needs to benefit mangrove ecosystem to survive their livelihood, because they are remaining poor.

To empower local community, the government encourages them to involved in community-based mangrove management. This is important to prevent degradation to happen again in the future, so sustainability of mangroves can be achieved. Community-based mangrove management (CBMM) is believed can accommodate community involvement and improve livelihood well-being through increasing income. Moreover, CBMM can make community interact with stakeholders and learn more about regulation, institutional, and policy (Datta et al., 212; National Mangrove Working Group, 2013; Kusmana, 2014).

Mangrove forests in Pesawaran district

Pesawaran district has significant mangrove area, spreads in three different locations: Padang Cermin, Punduh Pedada, and Marga Punduh (Febryano, 2014). Pesawaran district has 400 ha of mangrove forests that grow along 96 km of Padang Cermin and Punduh Pedada coastal areas, as well as surrounded by small islands with estimated coverage of 1.200 ha. Total mangroves in Pesawaran district are estimated at around 838,653 ha (Saputro et al., 2009). However, the coverage has declined due to conversion to shrimp ponds.

Pahawang Island, one of the case study locations has mangroves of about 141.94 ha (Rizani, 2007). Mangrove forests on this island have degraded due to various factors, for example taking timbers in unsustainable ways (Febryano et al., 2014). However, aquaculture sector is identified to give the biggest contribution to degradation in this area (Febryano et.al., 2014). The degradation that happened on this island started in 1975 when a company from Taiwan started cutting mangrove forests for almost 18 ha in two different sub-villages on this island and converted the area into shrimp ponds. It was followed by charcoal industry which cut mangroves as the material. The degradation kept happening until 2003 when a new trend in benefit mangroves appears as the shrimp hatchery companies were willing to

pay a particular species of worms from mangrove roots at relatively high price to be made as shrimp feed. This encourages the local community to cut mangrove trees as it provides more economic value (Rizani, 2007).

In 2011, mangrove conversion happened once again in different forms. The beauty of the beach of Pahawang Island has made some investors come and claimed to be the owner of the area and started to convert mangrove ecosystems into villas and fishing ponds (Febryano et al., 2014). It is argued that the investors have a strong personal relationship with the government (Febryano et al., 2014).

The alarming condition of degradation in Pahawang Island has made NGOs (Mitra Bentala) decided to start mangrove rehabilitation and restoration. It was started in 1997, by improving the community knowledge relates to the importance of mangrove ecosystems through various workshops. The NGOs effort in sustaining mangroves was getting support from European Commissions and UNDP. Furthermore, the collaboration has succeeded to determine Pahawang Island as a mangrove conservation area. This was strengthened by the issuance of the village rules. However, until 2014 the issue regards mangrove possession and claims still occur on Pahawang Island (Febryano et al., 2014).

Another village is Sidodadi, a location in Pesawaran district with mangroves coverage of almost 27.78 ha (Rahmayanti, 2009). Even though the mangrove coverage in this village is relatively small, however, they play important role in protecting the village from high waves. The location of the village at Lampung Bay and directly facing Sunda Strait make the village vulnerable to coastal disaster. In addition, similar to Pahawang Island, mangroves in Sidodadi village have degraded since 1990s with main factor being conversion to shrimp ponds on large scale conducted by commercial companies. Furthermore, the loss of mangroves has made local community lose their job as fishermen because usually, they catch by the ecosystems.

Local government arrangement

Mangroves in Indonesia are distributed across the major islands with estimated coverage of 2.8 million hectares (Kusmana, 2014). To manage mangroves located at lower

administrative levels, the central government delegated mandate to various government institutions and local governments at provincial and district levels.

The arrangement that divides mangrove ecosystems into several tenure arrangements makes various actors involved. The arrangement puts mangroves under state forests, communal land, and other land use areas. Within these categories, government institutions include are Watershed Management Agency, the District Forestry Agency that authority over the state forests, and District Fishery Agency and Marine Agency that authority over the other land use area. Together with government actors, non-government actors with important roles involved in the governance are NGOs, local community, village leaders, and the University of Lampung (Banjade et. al., 2017). However, the involvement of non-government actors is limited to activity on mangroves located in other land use areas. There is a particular arrangement of mangroves management at Margasari village, where mangroves are under the authority of various government institutions and local government control, but management conducts by the University of Lampung. These various arrangements indicate that complexity in mangrove governance has started from implementation of multiple arrangements on the ecosystems tenure that caused involvement of multiple actors.

Local government has another arrangement related to benefit of mangroves; for state mangroves forests, Forestry Law 41/1999 is implemented. This law divides forest areas into three different functions and utilizations including production-, protection-, and conservation zones. Across all the zones, mangrove areas can be found. If mangroves are located in production zone of the forest, it is prohibited for anyone to take timbers. This is also implemented in protection of forests. However, community can still benefit from non-wood forest products and environmental services. The most restricted zone for any utilization of mangroves is in conservation forests. In those zones, no actions can be conducted except for research and/or environmental services (Banjade et. al., 2017).

Other regulation implemented at lower level is Environmental Protection and Management Law 32/2009 which defines process and standard for local participation to sustain mangroves, and incentives for environmental conservations. This regulation has implications for mangrove management related to local community rights to do protections, rehabilitation and benefit mangroves. The Environment Law 32/2009 also provides

alternative forms of conflict and dispute settlement. Financing mechanism regulates in this law to incentivize activity in sustainable management, even though in practice it is not implemented. Meanwhile, for any destruction of environment, this law strongly states that any activity that led to destructions of the environment must be followed by rehabilitation and restoration (Kusmana, 2014; Sunyowati, 2016; Banjade, 2017).

Nevertheless, to govern mangroves at village levels (in other land use area), local levels have developed village their own rules and regulations. So, despite the plethora of rules issued to govern mangroves at national, provincial, and district levels, village rules are developed in accordance with local condition and specifically address mangroves as object to protect and conserve. The creation of village rules aims to improve local community efforts to sustain mangroves; consist of guidance to do monitoring, sanction for violating actions and other activities.

Conclusion

To conclude, Indonesia is a country where mangroves have important roles in the mangrove world. Mangroves in Indonesia are in diverse conditions of good and degraded. The government has initiatives to manage mangroves, in particular after the tsunami disaster hit west part of Sumatra Island. Various laws and regulations are issued to govern mangroves from central government to be implemented across coastal areas at regional levels. However, the implementation of laws and regulations caused many government institutions involved in mangrove governance. Both are caused overlapping related to authorities and actors. As mangrove governance is conducted at different administrative levels, this led to more involvement of actors. In addition, various arrangements implemented on mangrove forests such as state forests, community govern, and other land use. This overlapping arrangement has caused confusion among stakeholders.

Mangrove governance in Lampung province with multiple arrangements, levels, and actors is suitable for the conduct of the research, to answer the research question: how does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction

This chapter provides the research strategy, design, and selected methodology selected that underpin the research; it covers research approach, research methodology, data collection, data analysis, and interpretation, as well as ethical considerations. The research approach consists of the research paradigm and philosophical approach taken, followed by the research design that provides a case study design, multiple case studies as well a comparative design. The next section (section four) explores research methodology that presents quantitative, qualitative, and mixed methods, the methods selected, as well as setting out in detail the matter of sampling. Section five focuses on, research instruments for collection of qualitative data that encompasses the semi-structured interview, focus group discussion, participatory rural appraisal, as well as the use of secondary data. The sixth section concerns data analysis and data interpretation, along with research ethics. The chapter closes with the conclusion.

4.2 Research Approach: research paradigm and philosophical

This section presents the background to the research approach that begins with the research paradigm and philosophy from which the research is derived (Bergman, 2010). Research paradigms or philosophy play an important role in science and refer to a set of common beliefs and agreements from researchers related to how the phenomena should be understood and addressed (Kuhn, 1962). Methodology and theory that provide intellectual context to a body of research are included in research paradigm. Blaikie (2010: p.104) defines the research paradigm as, “the way of thinking that helps explanatory account based on limited contextual knowledge, open and unpredictable systems, and complex, non-linear interaction between elements that leads to emergent properties and self-organizing structures and processes”. Likewise, Denscombe (2010) describes research paradigm as the philosophical

foundation that is related to the researcher's ideas and assumptions in choosing the methodology for their research.

Research paradigm can be explained by_ three basic assumptions: the- ontological, epistemological as well as methodological (Guba and Lincoln, 1990). Denscombe, (2010) states that the ontological refers to the researcher's perception of social reality that can be sought through answering the question related to the nature of the knowledge of reality; epistemology is related to the nature of knowledge and the relationship between people who look for the knowledge (inquirer) and the thing or knowledge to be found out (the knowable).; Epistemology relates to how the researcher acquires their knowledge from social phenomena (Denscombe, 2010). Saunders et al. (2009) note that methodology is related to the mechanism to conduct the research to obtain the expected knowledge. Overall, it is considered that a research paradigm gives a guide to the researcher through fundamental systems of ontological and epistemological assumptions for the researcher to analyze and examine the social phenomenon and produce a particular thought or understanding of the phenomena until new knowledge can be gained (Saunders et al., 2009).

On one hand, ontology is noted as having two basic positions, namely realist or objectivism, and constructivism (Denscombe, 2010). The realist bears several characteristics, such as the researchers cannot influence the social phenomena due to it being beyond the researcher's coverage, the social phenomena stand independently, have a consistent and stable structure as well as relationship (Denscombe, 2010). By employing this approach, the researcher can be confident about the results of the study as more objective and unbiased than constructivism. The latter is when people's perceptions as the results of human thinking are the only way to understand the social world or phenomena, due to the social world being varied and therefore should be understood in its unique ways. In this approach, researchers should be aware of subjectivity in their findings since they have close interaction with the research participants (Denscombe, 2010; Bryman, 2012).

As this research aims to examine the relationship between governance system and performance in mangrove management, it, therefore, takes the constructivist ontological position. It categorizes as social realities that are concerned with the governance system and performance with the sustainability of the mangrove ecosystem. The governance systems

that affect its performance are discussed uniquely through the involvement of multiple actors, both government and non-government, various governance systems, arrangement and strategy, governance performance, and behaviour in overcoming conflict within mangrove management.

On the other hand, epistemology is highlighted through its two approaches, which are positivism and interpretivism (Denscombe, 2010). In addition, Denscombe (2010) suggests that the positivist researcher believes that in controlling and understanding the social phenomena, social science should adopt the procedures and principles of natural science, allowing for any social phenomena to be measured straightforwardly and accurately with a clear pattern. Meanwhile, interpretivism believes that the social world is subjective and can be interpreted differently by people (Denscombe, 2010). So, in the interpretivism approach, the researcher gathers the knowledge as a result of the research from interaction with people (May, 2001).

This research takes the interpretive approach because the knowledge is based on results from interaction with research participants as a subject that includes governance actors and communities. To analyze the mangrove governance, governance system, and governance performance, the researcher interacted with the governance actors and non-government actors; to analyze the conflict within mangrove management, the researcher interacted with local village leaders and the communities. The findings of the research are specific and unique due to it combining the governance systems, arrangement, and performance through mangrove management. Creswell (2014) suggests that the interpretivist approach allows researchers to understand the social world from the research participants' perspectives as well as through their experiences of the case or situation that is being studied. Furthermore, in the interpretivist perspective, social research is rarely explained through universal theories as in natural science, so it is inappropriate to treat social science and natural science as similar (Denscombe, 2010). Moreover, the use of qualitative methods to explain the results of the study makes it clear that this research stands on the interpretivist position, also known as constructivism. Gray (2004) notes that interpretivist approach is often employed in qualitative research.

4.3 Research design

Research design is a map that gives guidance and should be considered by researchers before they decide what methods will be applied in the research (Bryman, 2012). "It is a prior step that functions to ensure that the evidence obtained enables researcher to answer the initial question as unambiguously as possible" (De Vaus, 2001: p. 9). Research design provides the framework that helps the researcher particularly in collecting and analyzing data (Bryman and Bell, 2007).

Generally, the research design is divided into two methods: qualitative and quantitative methods, and "within these, there are several different research designs such as historical, experimental, case study, cross-sectional, longitudinal, ethnography and comparative designs" (Bryman, 2012: p. 45). Researchers must choose the research design that can help them address the research problems and achieve the research objectives.

This research focuses on several features – including multi-level governance, governance performance, and mangrove governance in practice –, that can be investigated by using in-depth interviews. Meanwhile, for the design, this research employed the case study design as it is a study about a particular case concerning the governance system towards mangrove ecosystem management in Lampung province, Indonesia. Therefore, the case study design will be discussed in depth.

4.3.1 Case study design

Case study design contributes to generating the researcher's knowledge as an individual, group, and/ or organization to understand the social phenomena with their complexity (Bryman, 2012). A case study is defined as "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence" (Robson, 2002: p.178). In particular, the nature of the case is by answering questions 'what' and 'how' (Yin, 2002). However, "besides answering the 'how' and 'what' questions, the case study design also has utilized to generate answers to the question 'why?' (Saunders et al., 2007). "This is the reason case study design is most often employed in explanatory research" (Saunders et al., 2007: p 146).

This research occupies the case study because the case study design has some features that are close to and compatible with the research question of this research: "How does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?"

Three key important points from the case study approach are recognized as follows: first, it is useful for the researcher to obtain and understand accurate knowledge regarding the context and the process of the research being conducted (Moris and Wood, 1991). Second, the case study design is said to be able to obtain in-depth and detailed information from various cases or issues (for example, governance issues, ecosystem, and livelihood issues) (Bryman, 1998), and it is also can explain the causal relationships between subject and issues (Kumar, 2011). The third important key point is related to the flexibility of case study design that enables researchers to utilize more than one method/technique or employ a combination of these in data collections (Saunders et al., 2007).

The case study approach can also facilitate a frequentative analysis, assist the revisions and reflections of the tools utilized, and developed the objectives of the research as new data and issues emerge (Eisenhardt and Graebner, 2007). "The combination of data collection methods or techniques may include interviews, observation, documentary analysis as well as questionnaires" (Saunders et al, 2009: p 146). Moreover, Saunders et al. (2009: p 146) note that "the using of case study approach required to use and triangulate multiple sources of data". Triangulation is described as the employment of different techniques of data collection within a single study to ensure that the data can answer the research question. For instance, the data in qualitative research that is collected through semi-structured group interviews can be appropriate for triangulating data from quantitative research that is collected by using questionnaires. Moreover, the employment of many methods that can produce a large amount of evidence and or documentation in case study design affects the data analysis process making it longer, more time-consuming, and more difficult to assess (Yin, 2002).

However, it has been criticized that the case study approach is hampered by a lack of accuracy and difficulty in presenting scientific generalization because the case study

approach is more analytical instead of statistical (Johansson, 2003). Moreover, the case study approach does not follow a systematic pattern or procedures, and it influences the results of directing the findings and the conclusions (De Vaus, 2001; Yin, 2002). Therefore, the research is required to use multiple case studies on the same issue or phenomena to enhance the range of case study research (Bryman, 1989; Yin, 2002).

4.3.2 Multiple case studies

The case study may contain just one study (single case) or more than one (multiple case studies) (Yin, 2003). It is argued that multiple case studies have more advantages than single case study (Baxter and Jack, 2008). This is because multiple case studies include some cases in a study that make the researcher understand cases through similarities as well as differences between cases (Baxter and Jack, 2008). Therefore, the researcher can provide important literature related to the similarities and differences they found (Vannoni, 2015). In addition, through multiple case studies, the researcher can analyze the data within the cases as well as across the cases, in contrast to the researcher with a single case study who cannot do the same (Yin, 2003).

Commonly, multiple case studies are associated with several experiments or studies (Baxter and Jack, 2008). However, the number of cases includes in the study depends on how familiar the cases are and how much information the cases can bring (Eisenhardt, 1991). There are two types of selection of cases in multiple case studies that will determine the result produced. The first, 'literal replication', is related to similar cases that will produce similar results, and the second, 'theoretical replication', is related to selected cases that are based on the assumption that those cases will generate contradictory results (Yin, 1984).

Regarding the findings, it is argued that multiple case studies can produce significant similarities or significant contracting results that can support the research (Yin, 2003). In addition, it can also generate more reliable results (Baxter and Jack, 2008). However, the researcher should conclude whether the findings are valuable or not (Eisenhardt, 1991). In most cases, the conclusions created from multiple case studies are more robust than a single case study (Yin, 1993; Robson, 1994). This is because conclusions from multiple case studies have been compared with the other findings from the other cases included. However,

there are a few situations where the multiple case studies are not applicable to be implemented because the case has no significant offers to the study and no improved robustness to the results of the study, such as the critical case, the extreme and unique case, as well as the revelatory case.

This research is employed through multiple parallel case studies in different locations observed relatively at the same time. Six villages with mangroves in two regencies in Lampung, Indonesia, represent the cases related to governing mangroves that the involvement of multi-actors occurs at multiple levels in mangroves influence the system and performance of the governance. The cases in six villages have given detailed descriptions and produced a robust result that is necessary to answer the research question. As the case studies depend on analytical generalizations, they rely on the logic of replication to provide external validation to the result because each case in case studies deserves to confirm or disconfirm the conclusions drawn from the others (Yin, 1984).

4.4 RESEARCH METHODS

4.4.1 Quantitative method

The quantitative method refers to the data collection technique that provides quantifiable data based on a standardized and systematic procedure (Kumar, 2011; Blaikie, 2000; Matthew and Ross, 2010). The quantifiable data in quantitative methods include numerical data and code (Blaikie, 2000). By employing the quantitative methods in study, researchers gain to get some advantages in three main aspects of the research, namely in collecting data, analyzing data, and data reliability (Patton, 1990; Matthews and Ross, 2010).

Regarding collecting data, the quantitative method enables the researcher to measure a large number of respondents as well as generalize the findings (Patton, 1990). For this reason, positivist researchers often employ quantitative methods in their research because they believe that a standard device of the scientific methods can be implemented for all phenomena, even though phenomena in the research depend on the context and may be different from the real world in practice (Bryman, 2011). Furthermore, research with quantitative methods highlights more the control of research instruments to subject or situation to determine their effects. For example, in a survey, the respondent is often

answering the question from what they know, or from what they see (sense of similarity), or from what they remember in their lives (important things) (Bryman, 2011). Therefore, the quantitative method is not appropriate to be utilized in collecting data related to culture and behavioural matters since there is the risk it will turn the study into a controversial issue (Bryman, 2011). Rather, it is more appropriate to utilize d qualitative methods to study social research including human behaviour (Hakim, 1987; Hall and Hall, 1996).

Meanwhile, in analyzing data, quantitative data is often employed in survey research by using the questionnaire (self-completion questionnaire and structure interview) (Bryman, 2012). A questionnaire, as the most broadly used tool in survey research, is a list of written questions that needs a respondent's answers based on his/her/ knowledge (Kumar, 2011). The data collected from questionnaires may vary based on the research, such as attitudinal data and behavioural data (Brewerton and Millward, 2001). According to Hall and Hall (1996), there are several types: the questionnaire without the presence of the researcher (self-completion individual or group), a questionnaire with the presence of the researcher: interview face to face and interview by phone.

Regarding the reliability of data, quantitative research is often described s as "researcher detachment" (Denscombe, 1998: p 173-176). It relates to the issue of researchers that often bring bias with their data collection and analysis. This can be eliminated by avoiding direct contact with the research participant (using anonymity, telephone, self-completion questionnaire, or the internet). Therefore, the results of the study will be more reliable and unbiased. The researcher will have full control to interpret, explain and make conclusions from the research. In quantitative methods, the objectivity of the research cannot be compromised (Bryman, 2012).

4.4.2 Qualitative methods

Unlike quantitative research which starts with theories, research employing the qualitative method begins with defining a very general concept (Bryman, 1988). Qualitative research is often characterized as meanings, a definition, symbols, metaphors, concepts as well as a description of things (Berg and Howard, 2012). It has several important tools that can be utilized by the researcher to collect data from the participant to solve the research problem.

The tools may include open-ended questions, in-depth interviews, and observation, semi-structured interviews, and field notes (Bryman, 2012).

In many aspects, research with qualitative methods is different from research with quantitative methods, particularly in data analysis and research strategy (Berg and Howard, 2012). The qualitative method allows researchers to have no hypotheses and occupy unstructured as well as non-sequential conduct in the use of small theory (Bryman, 1989; Kumar, 2011). It shows the flexibility of qualitative research; regarding research strategy, it also frees the researcher to employ various types of methodology, including data collection methods, and philosophies (McQueen and Knussen, 2002).

In qualitative research, it is argued that theory emerges from data, and the process expresses differently as 'investigative, bottom-up or do-it-yourself' but has the same aims to explain the qualitative research that is independent and original (Maxwell, 2013). In addition, the emergence of theory from data allows the researcher to construct and reconstruct theories where necessary, based on the data they generate, instead of testing data generated elsewhere by other researchers (Maxwell, 2013). Expressions and experiences of the participants are easily understood even when there is little or no information about them (Leedy and Ormrod, 2014: p. 141). Regarding data collection, qualitative research gives a full description to relate the participant involvement, and it makes qualitative research able to provide a large number of data consisting of real situations and people (De Vaus, 2014: p.6).

Meanwhile, in data analysis, qualitative research has no relation to statistics but depends more on the context and interpretation based on observations that involve people's perceptions to explore and collect individual descriptions, definitions, as well as the important events of phenomena that are being studied (Bryman, 1989; Burns, 2000; Blaikie, 2000; Matthews and Ross, 2010). To conclude, to understand people and situations, qualitative research pays more attention and recognition to human thought and behaviour in the context of social phenomena. The human behaviours in social phenomena may include thought, interaction, norms, reasoning as well as composition. By employing qualitative research, a close relationship between researchers and participants will be created, and it gives advantages to the researcher due to the ease for the participant to contribute to the research, and the researcher can easily understand the participant's perspective (Hakim,

1987; McQueen and Knussen, 2002). Even though qualitative research has claimed to decrease generalizability, it can inform and explain the research context in a more structured manner (Patton, 1990; Hakim, 1987).

4.4.3 Mixed Methods

As mentioned earlier, the researcher can employ more than one or a combination of methods in a single study (Bryman, 1989). The mixing of quantitative and qualitative methods in a study (mixed methods), focuses on collecting and analyzing data (Creswell and Clark, 2007). By combining the quantitative and qualitative methods in one study, the research will produce a range of various types of data better than if they use only a single approach, to get a better understanding of the area of research and the research questions (Creswell and Clark, 2007).

Darlington and Scott (2002) identified some of the purposes of employing methods as expansion, development, complementary, initiation, and triangulation. In particular, triangulation is often used in many works of literature on mixed methods; it aims to compare as well as integrate data that have been collected from both quantitative and qualitative methods in a single study (Creswell and Clark, 2007). Triangulation seeks the convergence of the results to enhance the credibility of the research findings to answer the research problem (Creswell and Clark, 2007; Patton, 2002). The use of triangulation is challenging and requires expertise and extra effort to solve the problem. This relates to the difficulty in the process of integrating evidence as well as the contradiction between the result of quantitative and qualitative approaches (Darlington and Scott, 2002; Creswell and Clark, 2007). However, the researcher should not consider the different data generated by employing a mixed methods approach as a problem, because differences in findings should be seen as complementary to derive a better understanding of the situation being studied (Brannen, 1992).

Three types of mixed methods have been highlighted; the first type is ‘quantitative followed by qualitative’ which aims to develop the instrument. It is the condition when the qualitative approach produces hypotheses to test the quantitative approach (Bryman, 2012). The second is when quantitative comes first, followed by qualitative methods. In this type, quantitative

methods provide statistical data that acts as the basis for comparison groups of the case sampling and will be followed by qualitative methods with in-depth analysis. The third model, 'qualitative and quantitative concurrently', is the condition where both methods give equal contributions to the research and produce two separate yet linked studies (Bryman, 1988; Darlington and Scott, 2002).

4.4.4 Selection of research methods

Among three research methodologies discussed earlier, this research employs qualitative methods to analyze multi-level governance in the mangrove. The research begins with a general concept about mangrove governance associated with multi-level governance that implies the involvement of multiple actors from government and non-government occurring at different administrative levels; followed by the analysis of decentralization system adopts by Indonesia government that affects mangrove governance, and conflict within mangrove management. Analysis qualitative is also suitable to analyze mangrove governance in conduct through the implementation of the concept of governance principles: how the eight principles employed in the analysis affect the governance. The characteristic of qualitative research in giving in-depth definition and description (Berg and Howard, 2012) is adopted in this research to understand the social phenomena occurring in the mangrove governance in practice and conduct. All aspects are social phenomena experienced by participants that are involved directly in mangrove management. Therefore, the analysis is conducted by interpreting information based on observation, description, definition provided by the participants. Moreover, the social phenomena

As an example of qualitative research, this research considers using a semi-structured interview, particularly to gain in-depth and detailed information regarding the governance system, arrangement, practices, and actors in managing mangrove ecosystem. It is appropriate to use semi-structured interviews to obtain in-depth information from a small number of people and cases (Patton, 2002). This is because qualitative research is flexible and allows researchers to set questions and talk about various topics in their way (Matthews and Ross, 2010). Besides semi-structured interviews, focus group discussions and participatory rural appraisal were also conducted with the aim is to engage with local communities and households as the user of mangrove ecosystem. The researcher was able

to examine their role in mangrove management and how they benefit from mangrove ecosystem goods and services, as well as observe the condition of mangrove forests and the village where mangroves are located.

There are criticisms related to the use of the data collection method for qualitative analysis that includes reliability of the findings and the interpretation of the findings which is considered a difficult part and often becomes a constraint in the qualitative method (Devine (1995). In this thesis, the research is described with careful design that includes selection of interviewees and verification of the information gathered through documentary sources and other interviews. In addition, interviewees remain anonymous.

4.4.5 Sampling

Sampling is a crucial procedure in research that relates to researcher determination in a representative sample chosen from the large population from which the generalization is made (Bryman, 2012). Denscombe (2010a) suggests two main techniques of sampling: random sampling (also known as probability) and non-random sampling (known as purposive sampling). The first sampling technique is often utilized in quantitative research, while purposive sampling is commonly used in qualitative research. Meanwhile, purposive sampling relates to the exploratory sample that pertains to the way new ideas and/ or theories are discovered (Denscombe, 2010a). In addition, Patton (1990) argues that purposive sampling is related to the time when the researcher decided to choose people or a site to be included in the research based on considerations of either provides particular or specific knowledge on the topic being studied.

There are seven types of purposive sampling (Patton, 1990): (1) Maximum variation sampling, describing how the researcher selects individuals that differ on a certain characteristic. If the researchers employ this strategy, firstly they should identify the characteristic before finding the individual or the site that matches the desired characteristic; (2) Typical sampling explains the condition when the researcher feels unfamiliar with the people, or the site being studied. They can select a typical sample by collecting survey data or demographic data about all cases; (3) Theory or concept sampling is when researchers select people or sites that can help them generate a new theory or a specific concept within

the theory. However, the researcher should have a full understanding of the theory or the concept that they are expected to discover during the research; (4) Homogeneous sampling describes the researcher's activity in selecting certain people or a location due to the people or the location posing es similar characteristics. In employing this strategy, the researcher needs to identify the characteristics and find individual or location that poses it; (5) Critical sample. Concerns the researcher doing research related to an exceptional case that represents central phenomena in one place in dramatic terms: (6) Opportunistic sampling. A technique used right after the data collection begins. Implemented if the researcher suddenly realise that they need new information in answering their research question; (7) Snowball sample. The situation when the researchers are not sure about best people to be interviewed due to the reason of unfamiliar topic or the complexity of the events. Thus, the researcher may ask for suggestions from participants during interviews to suggest others who have the potential to be sampled.

Qualitative research is characterized by the involvement of participants, selected by the researcher based on participant characteristics and knowledge (Patton, 1990). The selection of participants must include a clear rationale that can fulfil the specific purpose of the research question, and for this reason, qualitative research is often described as 'purposive' (Collingridge & Gantt 2008).

This research is qualitative; thus, purposive sampling is employed. In addition, this research also employs homogeneous and snowball samples. The purpose of a homogeneous sample applies to this research which is to describe a subgroup in depth (Patton, 1990: p.173). Moreover, homogeneous sampling is where the focus group discussion is based, and this research conducted several focus group discussions that relate to the livelihood in a certain location which is mangrove ecosystem. Meanwhile, snowball sampling is also employed to get the real knowledge related to the topic from the right persons.

Regarding sample size, quantitative research puts sample size as a central tenet of the research in methodological rules and statistic formulas, while qualitative research stresses more on the purposeful strategy and inquiry (Patton, 10990). This key difference influences the sample size required in qualitative research. Patton (1990: p. 184)) argues that "there are no rules for sample size in qualitative inquiry"; rather it depends on the user and the purpose

of the research, the objective that the researcher wants to find out, and the availability of time and resources for researcher to do research. A researcher adopting a qualitative research approach is free to decide the number of people to be sampled to obtain the information they seek. “The adequacy of participant numbers involves thoughtful decision-making; too few may risk adequate depth and breadth, but too many may produce superficial or unwieldy volumes of data” (Sandelowski 1995, p. 179).

This research selected several people and locations to be sampled. The locations are East Lampung District and Pesawaran District in Lampung, a province located in the southernmost part of Sumatra. There are Six villages were taken as a sample site: Srimonosari, Margasari, and Karya Makmur (East Lampung Regency), and Padang Cermin (Pahawang Island), Gebang, and Sidodadi (Pesawaran Regency). All sites were chosen due to the fact they are home to mangrove forests. Meanwhile, the selected people to be sampled were divided based on the purposes: provincial and district governance agencies (to examine the governance systems and practices) from multiple institutions related to the practice and conduct of mangrove management. They include forestry office at province levels, Forest Management Unit official at district levels and Watershed Management Centre, Fishery Office at district level, Environment Office at provincial and district levels, local village leaders, NGOs, and the communities involved in mangrove group. All participants are the most active actors in mangrove management. The samples can be seen in Table 4 below:

Table 4. Samples for the research

No.	Sample Criteria	Purposes	Technique
1.	Local Government agencies (from multiple institutions and levels): - Forestry office - Fisheries office - Environment office - Forestry Management Unit - Watershed Management Centre	To examine the mangrove governance system in practice and conduct	Semi-structured interview
2.	Communities and village leaders from 6 villages in 2 different District: -East Lampung District: Sriminosari, Karya Makmur, and Margasari Village - Pesawaran District: Pahawang Island, Sidodadi village, Gebang village - Non-Government Organization - University of Lampung	• The community's role in mangrove management • NGO involvement in mangrove management • University Lampung role in mangrove management	Semi-structured interview, questionnaire, Focus group discussion, -PRA (Participatory Rural Appraisal)

4.5 Data Collection

4.5.1 Semi-structured interviews

Qualitative data in this research was generated using semi-structured interviews. Semi-structured interview has been described as a flexible and informal approach that can be used by the researcher to capture detailed information on the social phenomena being studied (Hay, 2010; Dunn, 2005). The aims of semi-structured interviews are to collect data related to issues or social phenomena that are included in the research, such as governance system and practice, the role of actors involved in mangrove management, etc.

Semi-structured interviews consist of several key questions that help to define the areas to be explored, allowing the interviewer or interviewee to diverge to pursue an idea or response in more detail (Britten, 1999). This interview format was used to explore governance institutions and actors regarding their role in governing mangrove ecosystems. The flexibility of this approach is particularly strong compared to structured interviews; it allows for the discovery or elaboration of information that is important to participants but may not have previously been thought of as pertinent by the research team.

4.5.2 Focus Group Discussions

A focus group is one of the methods of data collection that is conducted through a group discussion on a particular topic and requires participatory involvement. It is, commonly used in qualitative research (Kitzinger, 1994; Morgan 1998; Longhurst, 2003). During the group discussion, the researcher guides, monitors and records all the activity while becoming a moderator or facilitator (Kitzinger, 1994; Morgan 1998).

In employing the focus group approach, the researcher should pay particular attention to the participant composition of the focus group to get the best quality of group discussion. The participant composition may include age, sex, occupation as well as social status. Steward et al. (1990) suggest that even though the composition of participants will impact the data gathered, there are no particular criteria for the best participant composition. The focus discussion can consist of mixed groups of ages, social professional status as well gender (Steward et al., 1990). However, the researcher should consider before the discussion begins regarding a mixed group relates to how participants may interact with one another (Steward et al., 1990).

This method shares the key characteristic as with any other participatory method, which is interaction among participants that influenced the data obtained to better reflect the social phenomena that are being studied, but the data collected from individual (Goss and Leinbach, 1996). It is useful in generating and collecting views and understanding from the participant's beliefs and experiences (Silverman, 2000; Morgan, 1998).

To conduct a successful group discussion, a researcher should place high consideration on interaction. In this case, the researcher can optimize the pre-existing group in the research location, because, with the pre-existing group, the participant can more easily recruit and interact with one another rather than create a new group/stranger group (Bloor et al., 2001). Moreover, participants from a pre-existing group have similar experiences that they can share because they feel more comfortable with one another (Bloor et al., 2001). However, Bloor et al (2001) argue that group discussion with stranger groups or participants will produce richer data since the participant speaks more freely and can challenge other

participants to share their experiences. There will be no repercussions among the participants of the group discussion (Bloor et al., 2001).

Along with the group's composition, the group size also matters (Steward et al., 1990). It is recommended that the researcher over-recruit participants in 'a slightly larger group', to anticipate the risk of people cancelling their participation or leaving the discussion (Steward et al., 1990). The optimum size for a group discussion consists of 6-8 participants but a lower (3-4 people) or larger number (as many as 14 people) can also work (Bloor et al., 2001). However, the researcher should remember that in doing a focus discussion, a small number of participants may risk limited discussions, while a large number of participants in a large group is potentially more chaotic and harder to manage since participants may feel they do not get a sufficient chance to speak or share their experience (Bloor et al., 2001).
Focus group discussion can be employed at any stage of research. The researcher conducted focus group discussions to explore how the community benefits mangroves, the role of the community in mangrove management, and their perspective related to the government arrangement. This method was also implemented to find out about activities on mangroves conducts by the community and government.

4.5.3 Secondary data

This research utilized both primary and secondary data. Primary data was gathered through the interviews and focus group discussions, while secondary data that was important in addition to the primary data was collected from relevant government documents and archives regards the prior event or phenomena that were suitable to answer the research questions. Secondary data involves using the existing data (Vogel and Clarke-Steffen, 1997). In this research, secondary data supports the analysis related to mangrove governance practice and conduct. It is recognized that the involvement of government actors from different institutions and levels was through the issuance of various laws and regulations. The secondary data is also utilized to find out the current condition of mangroves (the width and status). The documents, in this case, included reports, regulations, policies related to mangroves management, etc.

4.5.4 Participatory Rural Appraisal (PRA)

Participatory rural appraisal (PRA) is an approach that enables local people to be informed about and analyze local knowledge related to the condition and what local people do and plan for life (Mascarenhas et al., 1991). PRA grows out of several subjects of knowledges which are participatory research, traditions, anthropology, and research about farming systems (Chambers, 1994). PRA aims to build cooperation between local people, government, and other actors that are involved in development. In the implementation, PRA creates a group and exercises to facilitate the activities that include sharing information, analysis, and action (Mascarenhas et al.,1991).

PRA is appropriate to be employed in research related to ecosystem services. It can help identify particular aspects, such as the benefits that poor people gain from the ecosystem; how various groups benefit from the natural resource with different interests and practices; priority and values from the benefits of ecosystem services for social groups based on local wisdom; relates the local spatial data to the source of ecosystem services and continue to scenario building by implement technique of mapping and modelling; encourage in-depth conversation between the user of ecosystem services as well as with the managers (Poppy et al., 2014). Meanwhile, the sharing of knowledge in participatory methods is provided in three forms: (1) Sharing knowledge among local people conducts through group analysis as well as visual presentation; (2) Sharing knowledge from local people to the outsider. In this form, the outsider should restrain their ideas and let the local people pose their knowledge; (3) Share knowledge from outsiders together with local people (Chambers, 1994). Regarding the sharing knowledge process, Chambers (1994: p. 1439) underlines that the researcher should stick to the spirit of PRA philosophy to "stress on open access to information and avoiding professional possessiveness".

This research adopts the participatory method to explore the rural community in the mangrove coastal zone, regarding their role in mangrove management and their livelihood practices, namely whether or not they benefit from the mangroves. Similar to focus group discussions, the participatory process involves several people. However, the conducting of PRA lets the local participant disclose any information regarding their story or life related to the benefits gained from the mangrove ecosystem. As an outsider, the researcher

withholds their ideas and lets local people share their knowledge. Through this mechanism, the 'social energy' is expected to grow and create something positive (for example, a better strategy of living), due to "social energy" commonly emerged when individuals and groups [are] working together for the same purposes (Uphoff, 1992).

4.5.5 Fieldwork

The fieldwork was conducted from January to April 2019. The first step was to contact the participants by bringing the letter of approval to the government offices; it was followed by short field visits to inform the village leaders that the research would be conducted in their areas. The next step was interviewing several government officials from different institutions at provincial level. There were several trips to do interviews, and focus group discussions, as well as participatory rural appraisal in the community to find out detailed information about the village, the role of the local community in mangrove management, and the condition of the mangrove ecosystem. All trips were by land, except those to the village at Pahawang Island.

Each trip followed the same pattern: interviewing the local village leader and other key informants, meeting with members of the community and visiting mangrove locations through PRA participatory rural appraisal. Obstacles encountered during the trips included roads that were difficult to pass and the aforementioned location that could only be reached by boat. Each visit was usually a day long; the farthest location took between four and five hours to reach by car (departed at 06:00 am and arrived at home at midnight).

The official language of Bahasa Indonesia was widely spoken and used in interviews with government officials. However, on occasion, Javanese was also used to interview local community members (village level).

The conduct of interviews

This research employed semi-structured interviews. Several governance officers from multiple institutions and multiple administrative levels were invited to take part in semi-structured interviews to obtain information to answer the research questions. Interviews were

also conducted with non-government actors namely NGOs, University officials, and village leaders.

The mechanism to do the interviews started by visiting government offices related to mangroves to find out actors that are responsible or involved in mangroves management. The action followed by sending a letter to the office asking for permission to do an interview and making a phone call to ensure that the person accepted the letter and arranged the interview (the date and place where the interview take place).

The duration of the interviews varied; it frequently took from an hour to two hours with government officials. In the middle of the interview, it was often that the participants asked other officers to involve in the interview because the officers have knowledge about mangroves (snowball sampling). The information given through interviews was recorded and noted.

Interviews were also conducted with NGOs to explore their involvement in mangrove management particularly at Pahawang Island. In the same method before doing the interview, the researcher has to contact the NGO officers to ask for permission to do interviews. Similar to interviews with government officers, the interview with the NGO took about one to two hours, and the researcher was making a note of important information given by the NGOs. Meanwhile, information gathered from the local communities that live near mangroves was through interviews to find out more about livelihood and community perception of mangrove management.

The conduct of focus group discussion

Focus group discussion involved village leader and local community both active and non-active in mangrove group. To conduct a focus group discussion, the researcher contacted village leader to ask for permission and information related to the community that can be involved in the discussion. In addition, the date and location for discussion were also determined. The number of participants was about seven to ten people. This was because many local communities were interested in doing the discussion. Mostly, the focus group

discussion was held at the village leader's office, but there was also FGD that was held near mangrove forests. The average duration of focus group discussion was about two hours.

Based on focus group discussion, the community at the case study location is not allowed to benefit the mangroves, particularly the timber. However, local communities are still allowed to take the leaves or fruits from some particular plants that grow between mangrove trees and do fish cultivation in the ecosystem. At one of the locations (Srimonosari village), the forests are a perfect place for a type of bird that migrated from Australia to lay their eggs, therefore the local village leader also forbids the local community to hunt for the bird and or the eggs.

In some villages, it was known from the discussion that local communities were not only involved in mangrove groups because there were also mangrove security groups (community watch for mangrove), mangrove for educational, and mangrove for ecotourism purposes. However, all groups have the same purposes to sustain and secure mangrove forests.

All focus group discussions were carried out without the presence of government officials. However, in one of focus group discussions, officials were notified with the intention of gaining input from the community. The officers from the Environment office (from district levels) accompanied the researcher to the village and introduced her to key informants. Another purpose of their trip was to determine the condition of the mangroves. They joined the community to discuss mangroves after the FGD was done.

The conduct of PRA

The conduct of participatory rural appraisal followed the same pattern of contacting the local village leader and other key informants to ask for permission to do PRA. Later, meeting with members of the community and followed by tracking along the village to the mangrove ecosystem for from two to three hours. All PRA exercises without the presence of government officials.

During the PRA, the researcher took some notes and some pictures of the condition of the village and mangrove forests. It was noticed from the PRA activity that in the past, some

sub-villages are located just in front of the mangrove forests that were often flooded by seawater. This condition has made the local community agree to do mangrove restoration and rehabilitation.

4.6 Data Analysis and Interpretation

In qualitative research, the data collected is analyzed qualitatively. Generally, qualitative data analysis begins with coding that relates to serial processes of analysis including organizing, creating, and assigning research data based on the categories with the aim to create selective and relevant data (Neuman, 2013). Coding helps researchers to focus on the important issues of the research, which is presented in several forms, that is 'concepts, topics, themes and meaning' (Creswell and Clark, 2007). Boyatzis (1998) suggests three main approaches to creating themes and codes: theory-driven, prior data research, and data-driven.

It is the researcher's task to manage and organize the large amount of qualitative data collected from interviews, focus groups, transcripts, and field notes, and the use of software will give advantages (Burn, 2000). NVivo is one of the software that is often utilized to analyze the coding. is NVivo. It is a qualitative analysis computer software or tools that can help the researchers in data collecting through recording, linking similar ideas, as well as creating and exploring notes and or documents where the data is coded and linked to eliminate the gap between data and interpretation (Richard, 1999).

During the fieldwork, the researcher made notes, recorded interviews, and used photo documentation of the mangrove ecosystem at different locations. After completion of the fieldwork, the data collected was organized based on the actors, including interviews with government officials based on institutions, local village leaders, NGOs, and local communities by using a table. The researcher also summarized information from focus group discussions and PRA, and organized images taken in the field. In addition, to split the data findings to be analyzed in different chapters, the researcher also made Coding Table. The findings are then used in analytical data for Chapter 5 related to multi-level governance in mangroves, Chapter 6 concerning governance performance, and Chapter 7 on mangrove governance in practice.

4.7 Research Ethics

In doing social research, researchers interact with many people as participants (Flick, 2009). The researcher must consider ethical matters related to the protection of people who participate in the research as well as to protect the entire process of the research and data gathered to ensure it is not exploitative (Flick, 2009). Generally, ethical considerations aim to protect the participants by maintaining the main issues related to participant consent and data confidentiality (May, 2010).

This research concerns the ethical issues that are implemented throughout the process of data collection and publishing the finding.

(1) Approval for ethical review. The first process started before the fieldwork of data collection. The researcher was required to have ethical clearance that should be approved by the Humanities and Social Science Ethical Review Committee. The approval means that the committee ensures that the research components (including research methodology, design, instruments, questionnaires, and consent letter) were already reviewed and deemed safe to conduct based on the ethical review procedure of the University of Birmingham.

(2) Informed consent of the research participant. Before collecting data, consent should be verbally granted by the participant. The aims and the whole purpose of the research should be informed to the participant by giving a short explanation. For this research, emphasis was put on the fact the researcher was looking for information (both current and historical) about the livelihoods activities and strategies surrounding mangrove ecosystems as well as what the mangrove ecosystems provide to the livelihood. Therefore, I asked several pertinent questions to them. This information was given to everyone taking a part in the research. The researcher also informed the participants that their participation is voluntary, no compensation was involved, and that the information they provided was for research purposes only (including publications). Participants also had the right to ask questions before providing consent. Throughout the research process, I also was assured of the data collected from the anonymous participants.

(3) Research confidentiality. Research confidentiality and anonymity are also relevant to this study. Therefore, the identity of all the participants (government agencies, actors, communities) will be protected and remain confidential. Note-taking and interview

recordings do not include the contributor's identity or name, instead, the interviews only use a number as well as variable codes.

(4) Positioning in the research. This thesis is about actors involved in mangrove management. One of the actors identified who has an important role in mangrove management at one of the case study locations is from the University of Lampung. As the researcher works for the University of Lampung, it is important to state categorically that my position is neutral, and this connection has no bearing on the objectivity of the research findings.

4.8 Conclusion

This chapter presented detailed information related to the research strategy, design, and methods. As this research is based on social realities, it is based on a constructivist ontological position. Meanwhile, for epistemology, this research adopts the interpretivist approach because the knowledge is based on the result of interaction with research participants as the subject, including governance actors and communities. For the design of the research, I have determined to use the qualitative method to answer the research question. This is because the research begins with a general concept about multi-level governance (a social phenomenon) and it is characterized by the involvement of participants who are selected by the researcher based on participant characteristics and knowledge that give in-depth definition and description. In qualitative research, purposive sampling is employed along with the homogeneous and snowball samples in order to enable this research to get more in-depth information.

Regarding data collection, this thesis uses semi-structured interviews, focus group discussions, PRA, and secondary data. As there are criticisms related to the use of the qualitative method, the research in this thesis adheres to a careful design that includes selection of interviewees and verification of the information gathered through documentary sources and other interviews. In addition, interviewees remain anonymous.

CHAPTER 5

ARRANGEMENT OF MANGROVE GOVERNANCE

5.1 Introduction

This chapter examines the arrangements of mangrove governance in Indonesia. Mangrove ecosystems are associated with complex governance systems resulting from multi-level governance and their geographic location in the intertidal area. Multi-level governance implies the involvement of multiple actors in management at different administrative levels; this often creates another challenge of coordination. Therefore, this chapter sets out and discusses these key aspects; section 5.2 considers different administrative levels, followed by multiplicities of actors (5.3), and challenges of coordination in section 5.4.

The first section analyses the administrative levels of mangrove governance. This is related to the arrangement of government institutions at different levels, namely national, provincial, district, and village levels. Several stages in mangrove management such as planning, delegating, and implementing are conducted at different levels. Thus, the administrative level is a key aspect of mangrove governance. Another important aspect to analyze is the involvement of multiple actors: government and non-government actors. Government actors have important roles in the governance arrangement toward mangroves, as do non-government actors. Therefore, the second section analyses each type of actors with their roles in mangrove management at the research locations. The third point for analysis is the implication of the involvement of many actors at different administrative levels, creating a challenge of coordination. The third section analyses the types and mechanisms of coordination practiced by the actors involved in mangrove management and the reasons behind the lack of coordination across levels.

5.2 Multiplicities of administrative levels

In natural resource management, the multi-level governance system can be considered as the full set of actors and agencies, institutions, and processes (formal and informal), which decide on, or affect, decisions on how natural resources are used and managed (Nunan, 2016). This section discusses one of the key characteristics of multi-level governance which is the multiplicity of administrative levels. "Administrative" refers to levels including central, district, and village, and beyond national levels (international levels) (Gibson et al., 2000: 218). The administrative level is usually linked to the remit and function of government actors at each level, the resources, as well as legal mandates (Gibson et al., 2000: 218).

Based on the findings, mangrove forests in Indonesia are governed in a multi-level governance system. The governance arrangements involve administrative levels at national, provincial, and district levels. The case study locations are at district levels, consisting of six villages from two different districts. The villages are Margasari, Sriminosari, and Karya Makmur, located in East Lampung District, and Sidodasi, Pahawang Island, and Gebang village at Pesawaran District. Both districts are in Lampung province. Based on interviews in January 2019 with senior forestry officers (from different sections), all provinces with mangroves in Indonesia implement mangrove management as part of national development for coastal areas arranged at the central level. This means that sub-national level is directed and constrained by national plans and strategies for coastal areas.

The forestry officer that has worked for more than 24 years further explained in the interviews that at national or central levels, the government authorizes various ministries to manage mangroves, as stipulated in Presidential Decree No.73/2012, known as "National Strategy for Mangrove Ecosystem Management". The central government's efforts are manifested in the form of policies and programs to achieve sustainable mangrove ecosystems and community welfare based on the availability of natural resources that are integrated as part of national development planning system. To achieve these aims, the government issued policy guidelines to be implemented at regional or lower levels where the mangrove ecosystems are located.

A document provided by forestry officers showed several key points for implementation by government actors that are explained in the policy guidelines as follows: (1) government actors should control the benefit and conversion of the mangrove ecosystem with no net loss principles, (2) improve the ecosystem function and protection sustainably, (3) consider mangrove ecosystem as part of integrated coastal management, (4) strengthen the local government commitment, (5) encourage interaction and coordination between the government actors involved, (6) encourage community-based management, (7) increase the local government capacity in exercising authority and function in mangrove ecosystem management, (8) develop research and technology to support and strengthen the sustainability of mangrove ecosystems, and (9) manage mangrove ecosystems through collaboration between the government, private sector, and local community. This national strategy shows that the government at national level has the authority to make policy as well as delegate mandates to government institutions involved in mangrove management.

In addition to the document, the official explained in the interview (January 2019) that the devolved authority from national to a lower level in provinces is also affected by the decentralization system employed by Indonesian government. The decentralization system is believed to significantly influence the management of natural resources, particularly in transferring the process of responsibilities and decision-making power from national government at the central level to the lower level (provincial or subnational, or district level) and is sufficient to grow local initiatives and maintain networks to enhance collective action across scales (Larson, 2008; Underdal, 2010). The planning for mangrove management arranged at the national level is therefore delivered and implemented to the lower level with a different remit and function set up for the government actors that are involved in mangrove management at provincial and district levels.

Government actors with a mandate to be involved in mangrove management at the provincial level at the case study locations come from different government institutions offices, including the forestry office, environment office, and Watershed Management Centre (BPDAS), as well as the National Land Agency and Fishery and Marine Affairs that have a legal mandate for the management of coastal areas. According to officials from the fishery and husbandry office, and forest management unit (interviews in February 2019), most of the time the forestry office, environment office, and Watershed Management Centre play

active roles and were involved in many activities in mangrove management because the office tasks and functions are related to forest management including mangroves. In addition, these offices are always involved in special occasions or commemoration activities (for example commemorating Earth Day) conducted by the governor and or central government to do planting and replanting activities.

In addition, the forestry officer said, "apart from the mandate from the central government, the government offices involved in mangrove management have their sectoral mandate and authority on natural resource management based on their sectors such as forestry, environment, and fishery". Based on theory, this condition could be a concern as the mandates and authorities might be duplicated and potentially cause overlapping in authority (Cash et al., 2006; Baggio, 2017). Therefore, it needs consideration to avoid a mismatch between actors and institutions with the object that is being managed, because a mismatch of governance to the biophysical system may lead to another challenge to the effectiveness of governance as well as coordination and collaboration (Cash et al., 2006; Baggio, 2017).

At the provincial level, the mandate given to government institutions through the presidential decree is manifested and translated into a sectoral arrangement based on each government institution's sectoral mandates and authority. This occurs because the policy direction stated in the national strategy for mangrove ecosystem management does not specify or mention the detailed arrangement for the government actors to perform in mangrove management. Rather, it only gives a general direction. Therefore, based on the findings, government institutions must adjust and adapt the national strategy to the sectoral authority. The forestry officer explained in the interview (January 2019) that in Indonesia, the sectoral arrangement is known as "Tupoksi" or "Tugas Pokok and Fungsi" (main task and functions). In addition, all officers participating in interviews argued that they must focus on office main tasks and functions in practicing their work, including in mangrove management.

In addition to the sectoral arrangement, several officers mentioned in the joint interviews that involved Forestry office, Environment office, and Watershed Management Centre (February 2019) that local government at the provincial level has another set of laws or regulations related to natural resource management known as regional regulations. Consequently, the officers said that there are overlapping laws and regulations for

government institutions in management of natural resources, including mangroves, which are from central, provincial, and sectoral interests within their offices. A senior officer from the forestry office said, “government institutions need clear boundaries to synchronize their remit to their mandate to avoid such confusion” (January 2019). In the literature on multi-level natural resource governance, it is suggested that the government initiated and provided guidance on how to identify actors within governance by observing the role of civil society actors in facilitating interactions between actors both across and within levels (Sattler et al., 2016). This is important to avoid overlapping as happened at the case study locations. However, the dominant role should be determined and played by the government institution that has the most authority, so the government can influence the uptake and give a direction for interaction to happen, and ensure interaction remains within the governance system (Matzdorf et al., 2013).

In multi-level governance, the government agencies have to consider that each level is linked together by legal mandates and resource functions to synchronize the activity and budgeting, as well as to avoid overlapping in programs. Based on the interviews conducted in January and February 2019 with various government officers, it is known that at the provincial level, the government institutions and Regional Development Planning Agency (Bappeda) hold annual meetings to discuss development planning that draws various plans from various institutions. The officers mentioned that the proposed plans from sectoral offices are still subject to approval in the decision-making process at the annual meeting at the provincial level. After plan approval, there is an implementation stage that occurs mostly at the district level where the mangroves are physically located. Along with the implemented activity from the provincial level, local government at the district level has their sectoral activity to implement within the district jurisdiction.

As the national strategy is manifested into sectoral programs at lower levels, in many cases, the focus on mangrove management is not on the vegetation or the ecosystem of mangroves. Instead, it is adjusted to the main sectoral focus of each government institution involved at the district level. One government officer from the fishery and husbandry office said, “just because the official authority is not related to mangrove vegetation or mangrove ecosystem, it does not mean that the office cannot do activities practiced in the mangrove ecosystem. For example, activity from the Fishery and Husbandry office at the district level that office’s

focuses on fish breeding in mangrove locations" (February 2019). Thus, the office combines the activity to be implemented on mangroves with the office's main task for example fish cultivation in mangrove ecosystems and empowering the local community to do the activity together. The officer further explained that the program might seem to have no interest in sustaining the mangrove directly, but the officer argued that there was still a correlation between the program and mangrove management, as a mangrove ecosystem is a perfect place for fish to breed. Nevertheless, besides the fish breeding program, the office also conducted several mangrove planting and replanting activities. This is to demonstrate that the office is responding to the legal mandate delegated to the office to manage the mangrove ecosystem. Yet, this explanation strengthens the observation that there is a similarity of activity conducted by government offices of different sectors related to mangrove management which is mangrove planting activity.

All activities on mangrove forests are at village level. Based on the interviews with village leaders, it is known that the village leader has an important role, for example, to ensure all activities on mangroves are properly carried out in accordance with the direction of the government offices that implement the activities. Moreover, information gathered in focus group discussions indicated that local communities involved in mangrove management agreed that village leaders are capable of mobilizing local communities to participate in the program to sustain mangroves such as mangrove planting and replanting activities and secure mangrove forests.

To conclude, in terms of levels, mangrove governance in Indonesia is governed at national, provincial, and district (village) levels. At the national level, the government planned for mangroves to be implemented at regional levels (provincial and district levels) where the mangroves are located. This also occurs at provincial levels, as the local government also has the authority to manage natural resources in their jurisdiction. Meanwhile, the implementation stage mostly occurs at lower levels. However, before any activity on mangroves is implemented, the national arrangement is adjusted to the sectoral authority of each government institution involved. As a result of this arrangement, there is overlapping in authority and activities on mangroves during implementation at lower levels. There is also an adjustment to fit within sectoral priorities, activities, and ways of seeing and doing

things. Additionally, activity on mangroves is varied, and mangroves become the secondary object of concern.

5.3 Multiplicities of actors

The location of mangroves between the land and sea interface and the multi-level governance system on mangroves leads to the involvement of multiple actors. They create challenges that are related to multiplicities in actors' concerns, identifying actors involved and whether they are relevant or fit with the remit they have got in this case mangrove management. The number of actors involved in governance may be increased when non-government actors are involved in governance (Nunan, 2018). As previously discussed, mangrove management in Indonesia occurs at different administrative levels, namely national, provincial, district, and village levels. Within those levels, many government officers are involved from different sectors. At national level, the government has created a governance arrangement to implement the national strategies for mangrove ecosystems at lower levels. This means that more actors collaborate in mangrove management; both government and non-government actors, such as NGOs, members of the private sector, and resource users.

Based on the interviews (February 2019) with forestry officers, the dominance of government actors is in mangrove management in state forests, but in the forests located in other land use areas (Area Penggunaan Lain) various actors are involved, both government and non-government actors. The section identifies actors involved in mangrove management along with the legal mandate delegated to each actor and what the actors should do related to it.

5.3.1 Government actors

The findings showed that authority for coastal and ocean resources management including mangrove forests in Indonesia is primarily under the responsibility of the state, and the responsibility is shared among various government institutions. This arrangement is common in many countries with large coverage of mangroves; the government prefers to put mangroves under state authorization and management to maintain fairness and sustainability in the use of the ecosystem (Banjade et al., 2017).

In mangrove management in Indonesia, Presidential Decree No.32/1990 is the regulation that is the basis for a government agency to manage mangroves. It stipulates mangroves are protection zones when forests fall under state forests or are classified under other land use areas. In addition, this decree gives mandates to government institutions to maintain the forest areas of a width of 130m (mangrove greenbelt) multiplied by "the annual average of the difference between the highest and lowest tides".

The decree was strengthened subsequently by the issuance of Presidential Decree No.73/2012. It established the National Strategy for Mangrove Ecosystem Management that defined various government institutions involved in mangrove management, namely the Ministry of Forestry, Ministry of Marine and Fishery, Coordinating Ministry for Economic Affairs, Ministry of Home Affairs, Ministry of Environment, Ministry of Finance, Ministry of Public Works, and National Development Planning Agency. Based on the national strategy. among all the agencies, the Ministry of Forestry was determined as the lead agency. Presidential Decree No.73/2012 was accompanied by arrangement (not sectoral) and policy direction to regulate government actors involved. This regulation is important to identify which actors are relevant or fit with the management of natural resources within the governance of the sector. According to Nunan (2018), the goodness of "fit" is required to challenge the problem of effectiveness of the natural resource governance that the actors involved should fit with the biophysical system that is managed.

Presidential Decree No.73/2012 not only determined which government actors should be involved in mangrove management at the national level but also decided that the governor as the leader at provincial level should also take an active part in mangrove management by establishing "Mangrove Ecosystem Management Strategies and Strategy Coordination Team for Mangrove Ecosystem Management" at the provincial level. Moreover, based on interviews with forestry officers, the governor of provincial level has also supported all activity implemented on mangroves conducted by the team and works together with the government actors at provincial levels. This includes the Forestry office, Environment office, and Watershed Management Centre. Government officers involved in this study agreed that the three government offices are the most active mangrove management at the case study locations.

However, although the presidential decree determined the government actors that should be involved in mangrove management, it fails to specifically define their roles. Thus, sectoral legal mandates are implemented to govern the involvement of government actors. Nevertheless, the officers mentioned that most of the sectoral laws implemented are related to forestry and environment sectors that are also suitable for coastal marine resources and fisheries. According to Beatty et al. (2002), this situation occurs because management of mangrove ecosystems that falls under government coastal zone management programs requires participation and cooperation of several sectors including forestry, fishery, and land-use agency.

Forestry officers explained in the interviews (February 2019) that the mangrove ecosystem in Indonesia is mostly defined as primarily terrestrial forests and or as part of the marine environment. This definition is reflected in the legal mandate and authority given to mangrove management. Accordingly, when mangrove forests are located inside the state forests zone, the forests are considered predominantly terrestrial. One of the officers said, "in this situation, the government will then use Forest Law No.41/199 to regulate the forests because the frameworks are primarily designed for terrestrial forest ecosystems" (February 2019). The officer further explained that this law translates into the implementation of the regulations and the main authority of state forests being under the Ministry of Environment and Forestry or forestry office at lower levels. On the other hand, when mangrove ecosystems are considered part of the marine ecosystem, the legal mandate to manage mangroves is based on several laws and regulations related to fisheries and marine resources that are pertinent. They include the series of Laws of the Ministry of Marine and Fisheries No.17/2008, No.12/2013, No.34/2014, and No.40/2014, Presidential Regulation No. 121/2012 on Rehabilitation of Coastal Areas, and Small Islands Law No. 27/2007 on Coastal Areas and Small Island Management.

According to Beatty et al. (2002), the involvement of multiple government institutions from different levels (state and regional) in mangrove management can cause complexity derived from various policies and programs implemented in the management. In addition, this might also create another issue of overlapping authority or ambiguity in mangrove management and influence from the government's administrative and regulatory structure (Nunan, 2018). Based on the findings, this happens at the research locations when the dual sectoral

arrangements with various regulations and laws; often caused confusion, as reported by government officials. Some government officers simplify the definition of the range of their authority as the mangrove trees are under the jurisdiction of the Ministry of Environment and Forestry, while the sea is under the Ministry of Marine Resources and Fisheries. According to Banjade et al. (2017), this situation results from mangrove management under state-centered management, that mangroves are managed under management that suits many sectors. It means that rather than putting the focus only on forestry sectors, the regulation, law, and policy implemented in coastal management are also required for fishery, marine, environment, and land use sectors (Friess et al., 2016). As a result of this system, the governing system put many sectors under one regulation or law that splits or fragments the authorities into multiple national agencies (Banjade et al., 2017), while several different agencies at different governmental levels already have their sectoral regulatory authority over mangrove forests (Iftekhar, 2008; Islam and Wahab, 2005). Such government arrangements cause mangroves to fall in a gap between these boundaries where governmental management strategies and legislation may be contradictory or duplicative (Suman, 2019; Fries et al., 2016).

All government institutions involved in mangrove management have legal mandates and are nested into a structure of mangrove governance. This means that each institution has the right to make decisions and arrangements such as projects over mangrove forests, and this often results in the aforementioned overlapping in activities implemented on mangroves. The evidence shows that mangrove governance in Indonesia is governed through the multi-level governance system because nested institutions in mangrove governance in Indonesia aim to facilitate the interactions (vertical and horizontal) to make information, plans and resources can flow up and down the multiple levels. This is in contrast to the nested structure in the polycentric model that function is to solve the problem of fit (institutional and system function) on different scales (Wyborn and Bixler, 2013; Nunan, 2018).

Below are the sectoral legal mandates of each government actor involved in mangrove management at the case study location along with their sectoral basis authority over mangrove forests:

Ministry of Environment and Forestry

Several legal mandates manifested in laws or regulations have strengthened the position of the Ministry of Environment and Forestry at the national level to manage forests, including mangrove forests. These are Law No. 5/1990 concerning natural resources conservation, Law No. 41/1999 concerning forestry, Ministry of Environment Regulation No.201/2004 regarding the standard and criteria for determining mangrove destruction, and Law No.32/2009 concerning Environmental Protection and Management. These laws provide general principles, instruments, planning, and law enforcement in all forest management.

At the provincial level, the Ministry of Environment and Forestry splits into two different offices, namely the forestry office and the environment. However, the basic arrangement for mangrove areas that are designated as state forests mostly falls under forestry jurisdiction. This condition is confusing, particularly at the case study locations, as mangrove forests are mostly designated as "other land use areas" (Area Penggunaan Lain or APL), meaning the forestry office is not responsible for that area. In addition, the issuance of Law No.23/2014 concerning regional autonomy increased ambiguity because, based on the law, the forestry office no longer exists at the district level and the authority over state forests at the district level is represented by Forestry Management Unit agency (Kesatuan Pengelola Hutan or KPH).

Watershed Management Centre (Balai Pusat Pengelolaan Daerah Aliran Sungai or BPDAS)

Based on interviews, the Watershed Management Centre is a Ministry of Environment and Forestry representative that works at provincial level. The authority of BPDAS in forest management including mangroves is based on Ministry of Forestry Decree No. 26/Menhut-II/2010 concerning the Technical Guidelines for Forest and Land Rehabilitation. Regarding mangrove management, Watershed Management Unit Centre officers claimed that they support all activities involving the forests, including mangrove forests by providing free trees including mangrove tree seedlings to plant in a coastal area or any other type of forest. It also empowers local people to engage in nursery activities (mangrove and any other types of trees) and supervises d the activities directly. The existence of Watershed Management Centre at the provincial levels is part of administrative decentralization known as

deconcentration that refers to power transfer by central ministries to their branch offices located outside the capital (Ribot, 2004). This means that the responsibility of Watershed Management Centre (BPDAS) goes to the ministry and not to the forestry office at provincial level.

Fishery and Husbandry office at district level

The involvement of the Fishery and Husbandry office in the district level is related to the ecosystem of mangroves which is partly located at the sea. The legal mandate for the Fishery and Husbandry office at district level (at the national level this office is under Ministry of Marine and Fishery) is Law No 27/2007 on the Management of Coastal Areas and Small Islands. In 2008, the Ministry of Marine and Fishery issued the regulation for conservation which regulation is No.17/2008 to determine the type of conservation area and procedure for managing such an area. However, activities on mangroves conducted by the Fishery and Husbandry office at district level have focused more on fish breeding that is located in mangrove ecosystem instead of mangrove as an ecosystem or vegetation. The aims of the program were also focused on local community empowerment. However, a government official claimed that they have to adjust their authority on mangroves with their sectoral policies, and since the healthy mangrove ecosystem can benefit offshore fisheries, it means that the activity on mangroves is held by this office is still relevant to mangrove management. In addition, the government official explained that in the past the office has also held several mangrove planting activities as a form of accountability for its authority for mangrove management.

Local government of district level

Some officers from Forest Management Unit and Watershed Management Center explained that when an area with mangroves is classified as other land use area (Area Pengunaan Lain or APL), the mangrove forest falls under the jurisdiction of the district government. The legal mandate for the authority of local government over the district area is Law No. 23/2014 concerning Regional Government. Based on this law, when a mangrove area is used for commercial purposes, district governments are entitled to grant permits to handle informal land claims. Presidential Decree No. 32/1990 stated that all mangroves are categorized as protected areas, and therefore restrictions are imposed on how the area is managed. This

refers to the authority of the local government to manage and protect the mangrove ecosystem. The local government should prohibit conversion to other land uses purposes and timber harvesting. According to Piattoni (2009), the authority of local government delegated from central government to manage the natural resource is related to devolution in a decentralized system that refers to delegating power from central governments to local governments.

Forestry Management Unit/FMU (Kesatuan Pengelolaan Hutan or KPH)

This is a public service provider that is under the responsibility of central, provincial, and district authorities. Although part of the administrative structure, it is part of the Forestry Office that has authority at the district level, they have different functions and duties. The Forest Management Unit's authority is in the field/site which is mainly at the district level while the forestry office is at the provincial level.

The establishment of this unit aims to cope with several issues in forestry sectors such as the weak definition of forest land rights that often leads to tenure conflict, and the failure of forestry development institutions to address the actual problem at the ground level. Forest Management Unit represents the forestry office at the district level and acts as an interface bureaucrat or an intermediate actor that connects the state and local community. They influence, encourage, and enable local communities and local organizations to exercise more forest (mangrove) management. The officers described that the Forest Management Unit agency works in both formal and informal ways. Formal ways are based on their tasks and functions, but when they interact with the local community, they act informally. FMU is believed to be the answer to the forestry government's absence at the ground level. In joint interviews involving officers from Forestry and Forest Management Unit officers (January 2019), some officers said, "most of the time, we come to the village office and/or the field to talk and discuss the latest condition of forests including mangroves".

Among the legal mandates for the Forest Management Unit is Law No. 41/1999 on forestry. This law stipulates that the FMU establishment is to cover all forest areas and functions. Another legal mandate is Law No.23/2014 concerning the establishment of the Forestry Management Unit which is mandatory for the government at the provincial level to hold authority on protection and production forests, and it is also mandatory for central

government to establish Forest Management Unit to command authority in conservation areas.

However, there is a different perspective among Forest Management Unit officers related to their authority. Some FMU officers explained that based on the regional authority law, their focus is only on state forests, including mangrove forests. Meanwhile, some other FMU officers argued that their responsibility for mangroves remains the same over mangroves as state and non-state forests. The reason is that the Lampung governor issued Regulation No.84/2016 concerning the position, organization structure, and function of the forestry office in the province. Some officers from different districts said, "there is one of the clauses in this regulation clearly defined is that the FMU agency as part of forestry office has to support the rehabilitation program of lands and forests by providing materials or instruments and help the implementation of the forest rehabilitation programs located in other land use areas,". Therefore, based on the regulation, FMU officers should be actively involved in all activities on mangroves both in state forests and other land use areas.

National Land Agency (Badan Pertanahan Nasional/BPN)

Based on Presidential Decree No.73/2012, the National Land Agency holds a mandate to manage coastal areas. However, the legal mandate for this office is related to agrarian matters, as stipulated in sectoral Law No.5/1960 concerning basic Agrarian Law. The law regulates any land rights, including land for indigenous peoples. There is also Law No.26/2007, known as the Spatial Planning Law, which regulates the function of mangroves either as protected or cultivated areas. However, the role of the National Land Agency in mangrove management at the research locations is not particularly significant. This is especially the case when there is no conflict related to land tenure arrangement that needs to be solved by using the agrarian law.

Conclusion

It can be concluded that the location of mangroves at the land and sea interface and the multi-level governance system on mangrove governance has led to the involvement of many government actors from different institutions in mangrove management. The authority for coastal and ocean resources management including mangrove forests is primarily under the state, and the responsibility is shared among various government institutions. The central

government determined the government actors be involved in mangrove management through the issuance of a presidential decree. However, there is overlapping in authority, because apart from the decree, the government actors have also sectoral legal authority to manage mangroves.

Nevertheless, among the various legal authority or mandates for government actors (laws and regulations), only a few pieces of legislation are specifically targeted at mangrove management and conservation, while the other legislations are only included mangrove management as part of coastal management. Overlapping authority has caused overlapping in responsibilities and duplication in government roles.

5.3.2 Non-government actors

The complexity of natural resources caused by the governance system also happens in decentralized countries. This is related to the involvement of multiple stakeholders in natural resource management that occurs at different levels and is closely connected to the concept of decentralization (Nunan, 2018). In addition, in decentralization, a multi-level governance system is believed to be able to combine decentralized adaptive governance that is sufficient to grow local initiatives and maintain networks to enhance collective action across scales (Underdal, 2010). As a decentralized country, Indonesian government always encourages non-government actors to take part in natural resource management (including mangrove management) by developing schemes for involvement such as community participation, community-based mangrove management, mangrove working group, and the involvement of NGOs, and private sector. The legal mandate for non-government actors to be involved in mangrove management is given by relevant government institutions or village leaders. Decentralization of natural resource management can be a better way to accommodate various interests of local people to manage and sustain the natural resources (Mahdi et al., 2017).

In the situation where various actors are involved, Poteete (2012) identifies two types of actors involved in multi-level governance: actors that are directly involved in institutional design namely government agencies, NGOs, or international donors/organizations; and actors that are affected by institutional design such as livelihood strategy, ethnicity, gender,

and age. In this case, the state actors play a strong role in the institutional design and the decision-making processes. Whilst actors that are being affected by the institutional design are mostly non-government actors.

The involvement of various non-government actors with various interests is to sustain and guard mangroves and empower local communities. Below are descriptions of non-government actors involved in mangrove management at the research locations:

Local communities

Based on focus group discussions at different locations (March 2019), the interest of local communities in being involved in mangrove management is related to their important role as frontline guards in mangrove management at the site. In the past, local communities' interests in mangroves were because they were users dependent on mangrove resources, but currently, their interest in the forests is only for protecting the village from sea erosion and floods. This is particularly at Margasari and Karya Makmur villages that have experienced losing sub-villages due to flood and sea erosion. However, local communities can still benefit from the ecosystem of mangroves to catch fish or shrimps as most local communities near mangrove forests work as fishers. In addition, local communities can also take products from mangrove forests such as mangroves fruits and leaves to be further processed as syrup and chips.

Some villagers explained in the focus group discussions (and when the participatory rural appraisal was conducted in March 2019), that they do not take any timber or other product from mangroves as the village leader forbid them. The prohibition is also written in village rules. These conditions happened at all research locations. Some communities actively involved in mangrove groups mentioned that goods and benefits provided by mangrove forests have made them put considerable time and effort into management, conservation, and rehabilitation of mangrove forests.

Community participation and empowerment in mangrove management in Indonesia are regulated in Law No. 27/2007 related to coastal areas and small islands management. Several things regulated in this law include community rights, obligations, participation, compensation, objections, and complaints. Ministerial Regulation No.34/2014 also

regulates community participation but is more related to planning processes, capacity building, access to technology and information, capital, infrastructure, market, and access to other assets. However, the local community that is actively involved in mangrove management at the case study locations is not familiar with the regulations, so they rather mention that their involvement is voluntary since they are keenly aware of the environmental goods and services offered by mangrove forests.

Nevertheless, since the local community cannot take products from mangroves, they feel there is a lack of direct benefits for them. It has led some communities to be reluctant to participate in activities related to mangroves and continue to focus on their livelihood as fishermen. In response, the government established mangrove working groups, mangrove groups for ecotourism, and mangrove nurseries, as an effort to always involve the local community in any mangrove-related activity. The encouragement from the government has made villages at the research locations have more than one mangrove group. Most groups are initiated by the government to set management of mangroves as community-based mangrove management. However, there is also a mangrove group initiated by a local village figure.

So, based on information gathered from focus group discussions with local communities that are actively involved in mangrove groups, there is a group known as "PAPELING" in Sidodadi village which was created in 2000 and initiated by an important village figure. This mangrove group aims to restore and sustain mangrove forests in this area that were converted into shrimp ponds and also save the forests from illegal logging. Meanwhile, in Margasari village, several groups were mentioned to be active in mangroves protection and sustainably benefit including the Margajaya Utama group and Margajaya 1 group, environmental education group (which gives education related to the importance of mangroves to young generation), and other groups that benefit products of mangrove ecosystems sustainably and to empower local community such as shrimp paste processing group ecosystems, and fish processing group; at Sriminosari village about three groups active in mangrove management including managing the mangrove ecotourism; at Karya Makmur village, there is a group of young people that initiates mangrove restoration and rehabilitation; at Pahawang island there is local institution initiated by the NGO; and at Gebang village, there is mangrove group that manages mangrove ecotourism.

In the literature, community-based mangrove management is often defined as mangrove forest management and rehabilitation that involves and is driven by the community in the process of management directly (Walter et al., 2004). In addition, Datta et al. (2012) argue that it is mostly the initiative of the government which aims to conserve the ecosystem of mangroves and improve livelihoods. In many countries, Community-Based Mangrove Management has become an alternative for mangrove forests sustainability (Datta et al., 2012). The village leaders at the research locations explained that the implementation of community-based management succeeded in making the mangrove forests better, compared to mangrove state forests at one of the research locations where conditions are heavily degraded. The local community then initiates the rehabilitation of mangrove forests by conducting various mangrove planting activities.

Village Leader

The interests of village leaders to be active in mangrove management are to protect the village by sustaining mangroves and motivate the local community to be involved in mangrove management. The legal mandate for the village leader to manage natural resources in their jurisdiction at the village level is based on Village Law 6/2014 regarding the authority of village governments (including the village leader). Based on the law, the village governments have authority to set up the village development plans and to develop economic activities in their territories. Villages with mangrove forests can use this law for those purposes. In addition, for the distribution of the benefits of mangrove use, the government encourages village leaders to establish an economic organization, "Badan Usaha Milik Desa" (village-owned company).

Based on interviews with village leaders, it is known that village leaders can formulate village regulations concerning mangroves. So, despite the various national and subnational rules related to the trees, village-designed regulations have been proven to work effectively in mangrove management because they are tailored specifically to mangroves and the local community. The village regulations are integrated into resource management rules broadly at village and district levels.

Non-Government Organizations

In Indonesia, the NGO's legal basis for involvement in mangrove management is Law No. 27/2007 on Management of Coastal areas and Small Islands. The role of the NGO was found to be important in mangrove management on Pahawang Island. There is no specific reason given by the NGO related to their activity that is dominant at Pahawang Island, except based on the NGO's interests to help empower local community to do mangrove restoration and rehabilitation to sustain mangrove forests. The condition of mangroves in this area is heavily degraded and alarming on large scale underlies their involvement. Local communities exploited the mangroves in unsustainable ways. Some practices – timber extraction, the removal of worms living in mangroves' roots, and the conversion of mangrove ecosystems into shrimp ponds - worsened the condition of mangrove forests in the area. The local community did not seem concerned about the future of the forests.

The NGO started by finding out the reasons behind the degradation of mangrove forests. The officer said, "there is a lack of understanding related to the importance of the forests and unsustainable exploitation led the NGO agencies to emphasize community involvement and empowerment" (NGOO01). The empowerment and capacity building activities were implemented through workshops and training in mangrove management. The activity aims to facilitate and help in building cooperation between community groups, as well as forge communication between the community and the relevant government institutions. In addition, the NGO also facilitated the local community to work together with local government to manage the forests.

In 2006, the UNDP and the European Commission supported the NGO and local community to persuade the local government to issue village rules No.02/007/Perdes-phm/XI/2006 concerning mangrove forests conservation. Furthermore, the village leader also issued regulation No.03/007/KD-DPM/11.1/2006 concerning rules for mangrove conservation area, and village regulation No. 04/007/KD-BPDPM/11.2/2006 concerning the establishment of "Badan Pengelola Daerah Perlindungan Mangrove/BPDPM" or "Mangrove Conservation Area Management Board". The Mangrove Conservation Area Board is a local institution that is autonomously given authority by village government to manage Pahawang Island mangrove forests.

In the interviews, the NGO officers claimed that the establishment of the management agency aims to enforce the rules and realize its objectives, to conserve the mangroves. Many things are regulated by the rule of the mangrove conservation area, including obligations and prohibitions concerning the mangrove forests, the division of Pahawang Island division into several zones, and sanctions for violations that are applied gradually. To strengthen the local institutions, the management board, and the NGO conduct various activities related to capacity building for both members of management board and the local community. Capacity building aims to increase skills and knowledge, as well as the attitude of the management board and community funding for the capacity building conducted through training activities comes mostly from donor institutions (national and international).

The success of the NGO in empowering the local community drew attention from government institutions to involve the NGO in many discussions and coordination meetings related to mangrove sustainability. However, all the NGOs' suggestions based on facts from the field were never followed up by the government institutions. Rather, the local government at district levels still permitted investors to effect privatization of mangroves area and the conversion of mangroves to other uses. Inevitably, the NGO assumed that the invitation to coordinate efforts and hold discussions was only a formality and lacked serious intent. Nevertheless, the NGO still focused on its aim to help local communities manage the mangrove forests.

University of Lampung

The university has been involved in managing mangroves at the research locations (Margasari village) since 2004. The officers mentioned that the legal mandate for the university's involvement was established by the local government at the district level through a Memorandum of Understanding.

The University of Lampung is a state university, which means that those actors working at the university are government actors. However, in this research, the involvement of representatives of the University of Lampung is categorized as non-government actors because the background of the university is educational. This is also related to the problem

of fit in natural resource management, that is, the challenge related to the process of identifying which actors that are relevant to be involved in multi-level governance to make the governance system 'fit' to the biophysical system (Nunan, 2018). Therefore, the government can decide which other actors or institutions can take part in mangrove management at lower levels apart from the sectoral authority given to government institutions. In response, the University of Lampung officer active in the study of coasts in the coastal study explained that they have passed the challenge of relevance of involvement in mangrove management in Margasari village by engaging many experts in the forestry sector, as well as having a learning centre concerned with the development of coastal areas.

Based on interviews with some lecturers actively involved in the coastal study institute, it is known that after many years of involvement, the University of Lampung has done many activities to sustain mangrove ecosystems and increase local community welfare. The officer further explained that activities to sustain the forests are in the range of planting mangrove activities, mangrove nurseries, workshops, and several research related to mangrove ecosystems and livelihoods conducted by many researchers from the University of Lampung, both students and lecturers. It is also seeking to empower the local community by forming a mangrove women's group that works under supervision of Lampung Mangrove Centre (LMC), a local institution established by the University of Lampung as a center of study, information, and development of mangrove forests. Apart from women's empowerment, the University of Lampung through the local institutions is always encouraging the community to participate in mangrove activities conducted by the local institution, because the success of local institutions in the long term will not be definite without community participation.

Conclusion

To conclude, non-government actors at the research locations have an important role in mangrove management. The local community supports the local government through their involvement in various mangrove groups and community-based mangroves management. Meanwhile, the NGO supports the local government by empowering the local community to implement mangrove restoration and rehabilitation. The University of Lampung has a mandate to manage mangroves as the university has many experts in the forestry sector and

a learning centre that is concerned with the development of coastal areas. All activities conducted by non-government actors can support the government actors in sustaining the mangrove ecosystem.

5.4 Challenge of coordination

The involvement of multiple actors from different levels in multi-level mangrove governance has created challenges related to coordination and interaction (Mwangi and Wardell, 2012). This section analyses interaction and coordination including the mechanism of interaction and coordination, the aim of interaction, who facilitate the interaction, and how often the interaction happened (if there is any).

Regarding interaction and coordination, the Indonesian government through the National Strategy for Mangrove Ecosystem Management (Presidential Decree No.73/2012). has ensured and encouraged actors involved in mangrove management across sectors and levels to interact and coordinate. However, according to government officers from different sectors, in the conduct of mangrove governance, the interaction and coordination between actors involved in mangrove management are mostly conducted vertically and involved offices from the same sector at different levels. This type of interaction results from the sectoral arrangement applied in mangrove management, in particular at lower levels. Vertical interaction refers to the interaction between actors at different levels, while horizontal interaction refers to the interaction between actors within the same level (Nunan, 2018). Horizontal interaction only occurs at national levels when the ministries involved in mangrove management coordinate to discuss the arrangement of mangroves. There is no evidence of formal coordination between sectors at provincial or district levels to discuss the same activity on mangroves. This is despite horizontal interactions being seen as beneficial for facilitating cooperation and coordination between actors at every level (Nunan, 2018).

As discussed earlier in the section of multiple administrative levels, at lower levels, the national strategies transformed into sectoral arrangements. This has made government officers only interact with other government officers from the same agency at different levels. In contrast, the strategy to interact and coordinate has not been implemented in the practice of governance at provincial and district levels. Various reasons are recognized for

resulting lack of interaction and coordination, such as lack of incentives and budget allocation, a sectoral arrangement that keep record within the office, and lack of initiative of actors involved to do interaction and coordination. Termeer et al. (2010: p.5) suggest that the situation where interaction is difficult to conduct is referred to as the "coordination dilemma", resulting from "transaction costs of coordinating of multiple actors at multiple levels".

The interaction between the actors involved is also important to do planning for the activity, budgeting, and revenue expenditure (Nunan, 2018). In practice, government actors may have different opinions related to the importance of interaction and coordination, in particular, sharing information about the official plans or budgeting with other government actors from different sectors. For example, vertical interaction within the Forestry Office at the provincial level means officers do interaction only with other forestry officers from different levels, such as to Forestry Management Unit officer at district level or Watershed Management Centre at provincial level.

The mechanism for interaction and coordination is through regular formal meetings aimed to discuss the latest condition of forests (including mangrove forests). This vertical interaction mainly benefits to facilitate the resources flow, information, and the decisions made, up and down the system.

The implementation of interaction required a particular mechanism to facilitate the participation of actors from all levels of decision-making (Adger et al., 2005). The mechanism can be through the system of representation to share and facilitate information flow, and dissemination of decisions (Adger et al., 2005). Based on the interviews with government officers from forestry and environment offices, the collaboration between actors involved at the case study locations mostly occurs through formal requests from one government office to another government office to ask for information, to be a participant in workshops, or when one office needs to share and socialized a new regulation, or activity related mangroves. According to Nunan (2018), even though interactions are required, the frequency of interaction in practice may be infrequent or even nonexistent due to limited coordination and cooperation between actors which often leads to a lack of policy in general. In addition, government officers explain another mechanism of coordination is through joint

project-funded activities on mangroves with a budget allocation. A case in point is the development of mangrove forests at one of research locations (Margasari village) as an Essential Ecosystem Zone. They further explain that this program is initiated by the Ministry of Environment and Forestry, required coordination among actors involved in mangrove management in the area through various workshops.

All the interaction discussed above is mostly formal. There is also informal interaction between government actors across sectors and non-government actors conducted by Forestry Management Unit officers. Their position as an intermediate agency or an interface bureaucrat plays an important role in particular in linking the state and resource users (Messer and Townsley, 2003). As it is informal interaction, the Forestry Management Unit officers explain that the interaction mostly happens outside the government office, for example, at village leader's office or house, or in the forests. The interactions aim to share information or regulations related to forestry sectors and to discuss activity on mangroves by asking for local community and village leader opinions, or to do monitoring and mangrove protection with local communities to prevent violations. These roles of Forest Management Unit officers are aligned with the opinion of Funder et al. (2019) that the local government actors (in this case is Forestry Management Unit agency) have an important role in implementing state policies, laws, and projects at lower levels.

The Forests Management Unit officers further explained that informal interaction or coordination with other government officers is mostly from the environment office to share information related to forests (including mangrove forests), and in particular when there is a special occasion that needs to be coordinated. For example, when central government officials or any other important actors wish to do mangrove planting, the government officers usually interact and formatted a technical working group to succeed the planting program.

In the literature on governance principles (Lockwood et al, 2010), lack of coordination implies there is a lack of transparency, particularly in sharing data and information between government offices. This situation has resulted in many differences in the data between government offices on the condition and the expanse of mangrove forests. The officers from district levels argue that the condition of mangroves is good, while some officers from provincial level stated that many mangroves are degraded.

To conclude, the involvement of multiple actors across sectors and levels is not accompanied by appropriate interaction and coordination. Diverse contributing reasons include the sectoral arrangement that keeps records or data within a sector, lack of incentives and budget allocation, and lack of initiatives of actors involved in mangrove management to do interaction and coordination. Types of interaction recognized in the case study location are mostly vertical (between actors from the same office at different levels) so that the reporting process happens upward to the sector leads, rather than downward.

CHAPTER 6

MANGROVE GOVERNANCE IN CONDUCT

6.1 Introduction

This chapter analyses the conduct of mangrove governance through the application of governance principles promoted by Lockwood et al. (2010). The analysis is based on interviews with multiple actors from provincial and district levels involved in mangrove governance. In Chapter 2, eight governance principles were identified to be essential for effective natural resource governance of legitimacy, transparency, accountability, inclusiveness, integration, fairness, capability, and adaptability (Lockwood et al., 2010). All these principles were investigated through this research because it is believed that poor performance of one aspect of governance can cause degradation of mangrove forests (Lockwood et al., 2010; Springer, 2016). In addition, the findings support the need for the analysis of all aspects of governance performance.

The application of governance principles aimed to assess and identify how the system performs about each principle; what mechanisms are utilized by the governance actors to deliver on each principle; and what challenges are faced in governance performance in relation to the delivery of each principle and what the implications of these challenges are for the governance. The application of governance principles is within the context of multi-level governance where multiple levels can lead to a lack of transparency, efficiency, and effectiveness (Lockwood et al., 2010).

6.2 Legitimacy

The first principle analyzed is legitimacy of mangrove governance at the case study locations. The analysis investigates how the governance actors across levels obtain

legitimacy in mangrove management. Based on the framework developed in Chapter 2, the way the governance actors obtain legitimacy is affected by three factors: validity of legitimacy of the whole system in governance, the consistency of actors in implementing decisions and actions at different levels, and the ways the actors in mangrove governance carry out their responsibilities (Lockwood et al., 2010).

The analysis begins with the mechanisms to achieve legitimacy in mangrove management. Previously discussed in Chapter 5, actors who earned legal authority are varied and come from different levels. In practice, the actors and levels of working units achieved legal authority to manage mangroves through different mechanisms.

In the interviews, government officers (from forestry and environment offices) at provincial and district levels explained that government actors across levels obtained legitimacy to manage mangroves directly through legislation enacted by the government at a higher level, or local government leader (governor) at the same level. In the literature, this type of legitimacy relates to the authority that is deliberately given because the government actors or institutions' responsibilities are related to natural resource management, including mangroves.

The processes of obtaining legal authority are explained as follows: at the central or national level, the Indonesia government give authority to manage mangrove to various ministries through the issuance of Presidential decree No.73/2012, the National Strategy for Mangrove Ecosystem Management the main goal of which is to strengthen mangrove forest management across government levels in Indonesia. Previously mentioned in Chapter 5, among the ministries involved in mangrove management, the Ministry of Forestry is mentioned in the decree as the leader. In 2012, the Ministry of Forestry and the Ministry of Environment were still two different ministries. Through this decree, the central government put guidelines for, - and principles for the implementation of national strategies.

However, based on data related to the decree given by forestry officers, the issuance of the decree did not include detailed information related to government roles to implement the decree in the conduct of mangrove governance; whilst the ministries involved in the national strategy are multiple sectors with sectoral authority which differs from one ministry to

another. Yet, the decree attached some policy guidelines to navigate the implementation of the national strategy by setting targets to be achieved through the issuance of the national strategy. These include the control of the extracting product and conversion of mangrove ecosystem, increasing mangrove ecosystem function, putting mangrove ecosystem management as part of watershed management, involving the community in mangrove management or community-based mangrove management, building coordination between government actors, base management on research, science, and technology, to improve local government capacity in mangrove management, and encourage partnership in mangrove management between central government, local government, private sectors, and community. Along with policy directions, there are principles suggested in practicing the national strategy which are similar to the principles proposed by Lockwood et al. (2010): transparency, accountability, participation (similar to inclusiveness in governance principles by Lockwood), responsive (similar to adaptability in Lockwood principles), efficiency, effectiveness, and fairness.

This research found that a lack of guidance for government institutions at the lower level to implement the national strategy has resulted in the transformation of national strategy into sectoral strategy, carried out alone by each sector without any cross-sector interaction or coordination. This argument is strengthened by a watershed management official (government officer No. 2, interviewed in February 2019) that said, "at the lower level, our office has tasks and functions that we focus and refer to in conducting mangrove management, and we do not share nor discuss our work to other institutions". Based on the statement, it can be concluded that the national strategy is limited to legitimate the government actor's involvement at national level without assignment and supervision rules at lower levels. This is because some references suggested and mentioned in the national strategy are not well implemented, for example, the suggestion to do coordination across sectoral.

Based on interviews with forestry officers (interviewed in February 2019), another mechanism is identified to earn legitimacy at provincial level which is direct electoral processes held every 5 years. Lockwood et al. (2010) suggest that this mechanism to earn legitimacy is known as democratic legitimacy; the condition when the higher level of government (ministry) has authority to make decisions, rules, and delegate responsibility to

the government institution at a lower level, and the government at the lower level is responsible for passing enabling legislation (Lockwood et al., 2010). Decentralized policy allows a transfer of power within authorities from central to lower authority levels in a political administration as well as a territorial hierarchy (Ribot, 2004). This mechanism is particularly for local leaders at provincial and district levels. Most officers interviewed (in February and March 2019) explained that based on regulation, the elected leader (governor at provincial or Bupati at district level) has authority to manage natural resources in provincial or district jurisdiction. Government institutions with the responsibility to manage mangroves at the provincial level are under governor's supervision and responsible, while at district level is under Bupati's supervision.

It is stated in the decree that national strategy must be implemented at regional level, thus, the provincial leader (governor) should harmonize and adhere to the values in the national strategy with regional strategy. This includes principle of harmonious horizontal, vertical, and diagonal relations into regional policies. In addition, to implement of both strategies, the provincial government gives authority to government institutions with authority on mangroves include Forestry office, Environment office, and National Land Agency. However, the forestry officer at provincial level said, "for forest management (including mangrove forests) the authority mostly goes to Forestry office".

Previously explained in Chapter 5, all government institutions involved in mangrove governance adjusted national strategy with sectoral main tasks and functions. Based on the findings, this process created a thematic sectoral arrangement. For example, the environment officers said that their main responsibility is rehabilitation and restoration of degraded areas, therefore, activity on mangroves carried out by this office is related to rehabilitation and restoration of the degraded mangrove ecosystem. The senior environment officer (interviewed in February 2019, at the provincial office) said, "the basic or main concern of this office is how to restore and rehabilitate the degraded area, even though (maybe) the activity implemented is similar to other offices by conducting mangrove planting or replanting activities". Based on the explanation, it can be concluded that at the provincial level the national strategy is coordinated and invested by government institutions into various engagement activities based on sectoral tasks and functions, and in the literature, this condition refers to deliberate legitimacy, that legitimacy given by the superior

(Lockwood et al., 2010). However, through implementation, this type of legitimacy results in legal authority for lower-level government actors becoming sectoral. Nevertheless, the officers argue that sectoral arrangement makes them more focused on their tasks.

Producing better outcomes is another mechanism for actors to be legitimated. In literature, producing better outcomes to achieve legitimacy is also known as earned or outcome legitimacy (Newman et al., 2004; Boedeltie and Cornips, 2004). This mechanism is also found at research locations. Based on findings, activities on mangroves conducted by various government institutions at research locations are similar, in the range of mangrove planting and replanting activities. Several activities were recognized from the interviews that were held to encourage and contribute to sharing an understanding of the importance of mangroves to the community such as workshops and seminars. Responding to this, the government officers from the Forestry Office explained that activities conducted depend on each office's planning and the availability of funding that is suited to do planting activities. Nevertheless, the forestry officer said, "even though the activity remains the same of planting and replanting activities, the activities have encouraged the community to participate, and moreover, through planting activities, the government efforts produce better outcomes of mangrove forests condition".

Regarding the mechanism to get legitimacy through achievement, some forestry officers (both from the Forestry office and Watershed Management Centre) claimed that they are legitimated by stakeholders through their achievement in sustaining mangrove ecosystems, reducing the conversion of mangrove areas, and increasing local communities' participation in sustaining mangroves. Yet, local communities have their own perception related to the achievements of the government. In their opinion, government achievement is considered an obligation. Thus, they do not legitimize the government based on government achievement in increasing the condition of mangroves, but rather legitimize the government based on government authority. However, at some locations, the local community mentioned that the role of the Watershed Management Center is very important to provide tree seedlings to plant and make the condition of the forest better. In this case, they legitimate the office for the achievement of sustaining mangroves.

As most locations are in other land use areas (APL/Area Penggunaan Lain), the research found that interesting fact related to mangroves' condition at the case study locations is due to efforts of various non-government actors. Responding to this, government officers explain that non-government actors' involvement in mangrove activity is also part of the government's effort to increase community participation. In addition, it is also mentioned that government office (Watershed Management Centre) provides mangrove tree seedlings for non-government actors to do mangrove planting (as explained in Chapter 7).

Legitimation of non-governance actors

The analysis of the mechanism to earn legitimacy of the actors involved according to Newman et al. (2004) is through effort in taking leadership. Relating to this, the village leader (Kepala Desa) is the actor whose leadership has made them achieve legitimacy from stakeholders. Previously explained in chapter 5, village leaders at all research locations have an important role in mangroves management at village level, particularly in encouraging local community to take part in activities such as joint mangroves groups, mangroves planting activities, mangroves nurseries, and mangroves security group. Information gathered from interviews with village leaders indicates that Village leaders have also secured the implementation of village rule. Local communities respect and trust village leaders more than government officers. A government official from the Forest management unit said, "before any activity on mangroves is practiced, we first contact the village leader to make sure the local communities want to participate". So, it concluded that through the leadership, the village leaders obtained legitimacy.

Based on findings, another actor legitimized for having important roles and efforts (in mangrove management is the NGOs. In Pahawang Island, the NGOs (Mitra Bentala) have been legitimized by stakeholders to have full commitment to mangrove management since 1997, when massive degradation and conversion of the mangrove ecosystems into shrimp ponds happened on this island. Based on interviews with NGO officers, the initiative of the NGOs is to empower the local community to do mangrove rehabilitation and restoration conducted through workshops, fieldwork, and studies comparative to other provinces with mangroves; as well as connect them to the relevant government office. Hence, the NGOs get support from international donors, and they support the activity financially as part of their

appreciation of the NGOs. So, the NGO acquired legitimacy from stakeholders and international donors due to their engagement and efforts to sustain mangroves.

The research also found another actor that earned legitimacy from the stakeholders is the University of Lampung in mangrove management in Margasari village. The university enhances government efforts to stop degradation in the village. Through this involvement, the university earns legitimacy, not only from the government but also from the community, because later on the community recognized due to the university's effort the coastal area can be rehabilitated. In addition, the community is also appreciating government's decision to involve the University of Lampung in mangrove management. Enhancing the legitimacy of government actors while giving justification to a non-government actor can be achieved through the involvement of expertise according to Lockwood et al. (2010) is one of the mechanisms for actors to earn legitimacy. Previously explained in Chapter 5, the University of Lampung earned trust from the local district government of East Lampung to manage Margasari mangrove forests. The district government legitimized the involvement of the University of Lampung through the issuance of a Memorandum of Understanding in 2004. The district government underlined the fact that the university has many experts in forestry that can give a contribution to the sustainability of mangrove forests in this village. According to officers actively involved in the coastal study of the University of Lampung, the collaboration between local government and the university which has been conducted for a long time has brought changes in the condition of the mangrove forest from being heavily degraded to becoming better through several collaborative programs including workshops, community empowerment, and mangrove forest rehabilitation (planting and replanting activities).

To conclude, several mechanisms to earn legitimacy promoted by Lockwood et al. (2010) are recognized to implement at the research locations. Most government actors earned legitimacy actors involved earned legitimacy because of their authority the government and responsibility are related to natural resource management including mangroves; while legitimacy earned by non-government are more varied, from government institutions and community for their effort to reduce degradation, sustaining mangroves and empower the local community.

Key aspects of legitimacy

Several key aspects affect the process of actors earning legitimacy in mangrove governance, including clarity, synchronization, and perception. The unclear responsibility of government institutions was identified by some local communities near mangrove forests through PRA activity at one of the case locations. Local communities that are actively involved in youth organizations are confused as to which government actors or institutions they have to contact, to report the degradation of mangroves in their area, whether to the Forestry office or Environmental office. The leader of the organization mentioned in the focus group discussion (in March 2019) that this confusion resulted from a lack of information shared with local community relating to the rules or regulations, the status of forests, and responsibility of government actors. He said, "we have no clear information to whom to report because we do not have any knowledge related to the status of the location". This happened in Karya Makmur village East Lampung district. According to an environment officer at provincial level (interviewed in March 2019), mangrove forests in this area are state forests. The condition of the forests is heavily degraded due to conversion to shrimp ponds, and this is not supposed to happen because state forests are prohibited for communities to convert. Information from FGD with the youth group revealed, that a sub-village has been gone due to sea erosion; and for this reason, local communities initiate to do rehabilitation and restoration by planting mangroves. Nevertheless, the local community was confused about the status of the land and which government office to contact; considering that it is a state forest (under the authority of the forestry office at provincial level) but needs to restore and rehabilitate which are the responsibility of environment office (at district level).

In this case, sectoral authority as a result of sectoral legislation has made the government work in accordance with its sector. This limitation has caused confusion in the local community. Therefore, the government should make their authority clearer, and practice in accordance with the authority (clear and synchronize to authority) to avoid confusion between the government officials and the community. So, based on findings, it can be concluded that the authority and action of government actors at the case study location are not always clear and synchronized. This confusing situation can reduce community trust in

the government authority in mangrove management and for a long time, it can affect the government's legitimacy.

Apart from clarity and synchronization, Lockwood et al. (2010) suggest perception as important key to principles of legitimacy. As analyzed in Chapter 5, pluralism of actors involved in mangrove management at the case study locations both government and non-government actors have raised various perceptions related to propriety of actors to deserve recognition (legitimation) for their efforts to sustain the mangroves. Perception (good) given to actors that have authority after exercising their authority can be one of the indicators of obtaining legitimacy (outcome legitimacy) (Lockwood et al., 2010).

Previously mentioned, multiple government institutions are involved in mangrove management in Indonesia at different level. Based on interviews with non-government actors (local community, village leader, and NGOs), they are mostly agreed that the government actor that they recognized to have commitment in sustaining mangrove forests is the Forestry Management Unit (FMU). They have good perceptions for the officers in conducting forest management. However, in Margasari village, local community have opinion that responsibility to manage mangrove in this area is under the University of Lampung authority. In their perception, mangrove forests belong to the university. The community perception underlines various activities carried out by the University of Lampung through local institutions established by the University of Lampung to empower local community. In this case, the University of Lampung indirectly achieved legitimacy from the community due to their concerns and efforts in mangrove management have arisen good perception in community.

6.3 Transparency

Apart from legitimacy, transparency in conducting mangrove governance is also an important concern. This part analyses the implementation of transparency based on key points drawn from the literature on governance principles including the availability and accessibility of accurate information related to governance conduct in mangrove management (Lockwood et. al., 2010). The information is related to actors who make the decision at different levels, the visibility or clarity of the mechanism or processes of

decision-making, the reasons behind the decision making, and reporting mechanisms. Visibility is associated with the process of decision making related to the actor making the and how it has been reached and its justification; while clarity refers to expressing the reasons behind decision making (Lockwood et al., 2010).

The first analysis of transparency is related to the decision-making process that happens at different levels. Based on findings, at national levels, various ministries are involved in National Strategy for Mangrove Ecosystem Management and become actors who make the decision over mangroves. All the decision made at this level is implemented at the regional level. Regarding the process, the forestry officer mentioned that it conducts through internal meetings limited to the ministerial level and officials from one level below. As the government officer state," when a new regulation or program needs to introduce or familiarize to the community, the head of the office from provincial level sometimes invited to the coordination meeting, but mostly to the relevant ministry". Officers at the lower level must wait for the mandate to be delegated. Meanwhile, based on interviews with several officers, the process remains the same at the lower level; that decision-making within the office only involved officers with an important position. It can conclude that the process of decision-making is lack visibility and clarity because it remains closed, limited to the team member or leader position.

According to Lockwood et al (2010), transparency is also important to inform the actors behind the decision. This is related to visibility in the process of decision-making gives contribution to creating community justification for government. If this condition happens in a long term, it will affect the conduct of the governance (Lockwood et.al., 2010; Davidson and Stratford, 2000). This happens at the research locations, that lack of transparency regarding actors who make the decision have caused some officers at lower level have an excuse to say that government at a higher level or their superior at the office as actors who made inappropriate or contradictory rules, regulations, or actions implemented that make people disagree or disappointed. A villager gives example in the interview related to the community questioning the clarity regarding rules or regulation of the conversion of mangrove ecosystems into tourism areas and followed by the closure of access to the sea. To respond to this, the forestry officer simply explained that the regulation was made by the institution at a higher level and their duty is to implement it at a lower level without any

detailed information to support the explanation. Moreover, interviews to cross-check officers from the forestry and forest management unit resulting answers that based on the structural position at the office, their position is to implement the rule or regulation, while officers at higher levels are responsible to make decisions. According to Lockwood et.al. (2010) If this condition happens in a long term, it will affect the conduct of the governance.

However, based on findings, transparency in the decision-making process is identified at the village level at most of the research locations. The findings are strengthened by information from the village leaders at research locations and supported by local community. Village leaders explained the formal process of decision-making in the village that mostly takes place at the village hall and is attended by village officials, government officers, village key leaders, and the community. They mentioned the process as a village meeting (*rapat desa*). Some villagers mentioned that village meetings were held to discuss various events including activities on mangroves that are important for the community. The village leader gives an example that when mangrove conditions started to degrade and the sea level was rising, the village leader and some village officials met together at the village hall with the community to discuss the action of rehabilitation plans as well as compile village regulations for people to stop cutting down mangrove trees. The clear process of decision-making at village level

In other cases (in the different villages), when someone was caught taking timber from mangrove forests, the village leader and the community met together to find a solution and to decide what punishment should be given to the person and what should be done to avoid the same thing to happen in the future. Some local communities mentioned in the process of focus group discussion that they are allowed to provide input, ideas, or suggestions. As consequence, when the idea has been stipulated into a village regulation and approved by all villagers, local community cannot complain or protest in the future. Some villagers said that they must have committed to implementing the rules they have made together.

While village meetings are more formal, community meetings that are usually held at the village leader's house are more informal. However, some local communities mentioned that not all decision-making processes involved them. The findings show that at two research locations, there are also private meetings between the village leader and his personal network

consisting of important actors, and the community is excluded from the meeting. For example, in study locations, some investors came to the village and started to build villas and shrimp ponds near mangrove forests. Based on information from the local community, the investor can show them the permission letter from the village leader to convert the mangrove ecosystem. Therefore, they build a villa or shrimp ponds; in other cases, when the village leader discussed about building access to mangrove forests with the actor from the private sector and then the private sector gave funding to build the road.

Transparency is also related to the availability of information and accuracy of data. To be transparent, the information and data from the government or other actors involved in mangrove management should be available, accessible, and accurate (Bellver and Kaufman, 2005; Florini, 2007). In mangrove governance, the government at national level clearly states that in implementing the national strategy of mangrove ecosystem management, the government actors should put concerned about transparency, by providing accurate information that can be accessed by the community. However, in practice, it is not easy to get information from government officials, especially at the lower level. As previously explained that sectoral arrangement is implemented at almost government office along with the sectoral decision, thus the information as an outcome of any actions of the government institutions remains as sectoral information and is kept within the government office.

The forestry officer stated (interviewed in February 2019), "for internal purposes, of course, we have information and data related activity on mangrove to be reported to a higher-level government office or to the regional leader (governor at the provincial level or Bupati at district level) through the report for coordination meeting or annual report as a form of accountability or responsibility report". However, according to FMU officers, some important information or data cannot be published. There was no specific reason for this, but they mentioned that general information that is usually required by the community or researcher (data related to coverage and latest condition of mangrove) can be asked from the government office or seek the data from the official website. For example, information-related activities or projects on mangroves, are mostly shared in the range of the type of activity conducted such as mangrove planting, along with the resume of the activity whether it is a success or failure. There is no detail particularly information related to budget allocation. The FMU officer mentioned that the detailed information was made for report

purposes within the office. For example, if the activity on mangroves is using the regional budget, thus the report should be presented to the governor and member of house representative at the regional level.

Based on the interview, the forestry officer said they are trying to be transparent by sharing information and data on both sides: success and failure in mangrove activity. However, when the officer informed the data, it seems that only failure in mangrove activity due to natural causes can be consumed by the public. For example, mangrove planting activity failed due to the newly formed forest being swept away by a big wave. However, when they have been asked about the related failure of the project due to human error (corruption), the officer is reluctant to share the information due to ethical reasons. A similar attitude has also been shown by non-government actors involved in mangrove management. Mostly, only success stories are shared with the public, while important information related to the funding allocation, or corruption remains kept within the office (for internal use). Nevertheless, they claimed that they have been transparent in giving information to the public.

However, when the government officers claimed that they have shared the information dan data is available and can be accessed from the office or office website, in fact, it is not easy to get data or information from them. Various reasons behind this condition, including officers, were keeping the information without any particular reason; or the officers have no data or information to share because they are new in the position. Moreover, some important data are kept individually by former government officials that have been rotated to another office. So, when the public (community/researcher) asks for the data or information, the government officer introduces other officers to be asked. The office should put more concern related to the situation to ensure institutional data or memory.

In addition, the lack of transparency in sharing data or information between and within governance actors sometimes resulted in differences in data shared with the public. For example, from the interview, the government officials at district level mentioned that the condition of the mangrove ecosystem is heavily degraded, while the officer at the provincial level mentioned that the forests are restored and no more degradation; a government office mentioned that the condition of mangrove is good, in contrast, another officer from different sector said that the forests are heavily degraded; or when people the village level mention

that mangrove degradation is still become a problem along with the data conversion occur in the village, the contradictory answer is given by the government office at mangrove degradation is no longer happened in that particular area. So, the data to be shared with the public are varied.

It can conclude that the decision-making process is not always visible (or transparent) due to its hold sectoral within government offices at each level. This has made the community lack information related to which government actors decide which rule to implement. In the community's opinion, all the decisions on mangrove forests are decided by the Forestry office due to mangrove ecosystems are categorized as forests. This is the importance of transparency, to make people recognize the actors who decide, along with its justification. So, when actors involved in mangroves management and having the authority to make the decision over the mangroves are not transparent, people will have adverse perceptions toward government actors. Therefore, all rules or regulations that have potential to grow contradictory to the community's interests should be familiarised to the community to make them understand the role of each government actor involved in mangroves management. It is important to maintain the community's perception of governance in the conduct of mangrove management. In addition, the decision-making process of a government office is not transparent due to sectoral arrangements that make the office assume that the data and information should be kept within the office, along with the report of projects or activities that are mostly for internal purposes. Lack of transparency in sharing information related to the decision made is also identified. This is because many decisions are not well-communicated to the community or to other related actors. At the moment, little data and information that are available and accessible need to be more detailed.

6.4 Accountability

Accountability is the principal requirement for actors to receive power or authority as well as answers for actions they have undertaken (Greiber and Baig, 2010). Meanwhile, Robbins (1998) relates 'power' to the potential possessed by institutions or individuals to influence others' behaviour, while authority refers to legally or regulated founded mandates, responsibilities, functions, jurisdictions, or tasks of an official or organization. Analysis of the accountability is based on several aspects such as the process for holding the government

(actors and structures) and non-government actors to account, which includes the mechanism (and frequency) of the accountability, and evidence to show the accountability whether it is downward or upward, formal or informal, and vertical or horizontal.

The first analysis is the mechanism of accountability of government actors across levels at the research location that based on data is generally the same. This is because government institutions in Indonesia have a standard process of accountability. The government develops a systematic series of various activities, tools, and procedures designed for the purpose of reporting performance to government agencies, in the framework of accountability and improving the performance of government agencies. Therefore, to be accountable, government officials should follow the structure based on the accountability system.

The multiple officers mentioned in the interviews that based on the system, the process of accountability of government officials at all levels is through formal way and refers to vertical accountability. It means that the government at a lower level shows accountability to the government at a higher level within the sector. In practice, Rosenau (2000) argues that mostly vertical accountability tends to be more dominant over horizontal accountability. According to Stapenhurst and O'Brin (2005), vertical accountability makes actors (for example community and other non-government actors) can obtain the performance of the office-based on standard (good or not). These conditions underlying some conditions at research locations include lack of transparency (data shared) and lack of horizontal accountability to the community or other non-government actors.

To respond to this, officers from the environment and forestry office have the same explanation that the format of accountability to the community might be different. The forestry officer further mentioned that in Indonesia, most people interchangeably referred accountability as responsibility. For two have the same meaning. Therefore, the government's accountability to the community is practiced through responsible for every government action. Further, the officer gives an example of mangrove planting activity carried out by the government would be supervised by Forest Management Unit officer for the whole process. Although the local community participates in the activity, all the consequences that might appear due to the activity will be under government responsibility.

According to Larson and Soto (2008), it is common in a country with a multi-level and decentralization system that accountability conducts upward to the higher level of government because the system is arranged so. The reason behind the dominance of vertical accountability is due to the governance actors at the devolved level prefer to give the report related to natural resources upward rather than send it down to the community; and similar things have also happened at regional and national levels (Ribot, 2003). In addition, the sectoral arrangement applied in government institutions also gives a contribution to upward accountability because many times the government officers mentioned that government officers only have to focus on the sectoral arrangement as their performance is judged by their superiors from the same sector (at a higher level). Regarding the lack of downward accountability, in this case, the government should put more consideration, as the role of the village leader and the local community in the mangrove management is important. This is because a lack of accountability (vertical and horizontal) will affect the power distribution within a governance system (in multi-level governance) and potentially hold actors and structures to responsible for their decisions, especially from governance actors at the higher level (Nunan, 2018).

To overcome this situation (upward and downward), Stapenhurst and O'Brian (2005: p.3) suggest diagonal accountability, which is explained as the condition that results when vertical and horizontal accountability is combined. This type of accountability requires interaction and engagement between the vertical accountability actors and citizens in the working of horizontal accountability institutions through breaking the government's monopoly over responsibility for official oversight. It aims to strengthen the function of the citizen's watchdog (Stapenhurst and O'Brian, 2005: p.3).

The different processes of accountability are shown by non-government actors involved in mangrove management in the district. The officer from the coastal study section explained that the mandate for the University of Lampung to manage mangroves at district and village level (in Margasari village) is given by the local government at district level. However, the mechanism to do accountability is not clearly mentioned in the agreement between the university and local district government. Related to this, the officer explained that mostly it conducted through formal meetings with the local government at the district level. So, the University of Lampung provide the report and present it in front of district government.

However, sometimes the achievement in mangrove management is presented in workshops or seminars so people can get information related to the achievement of the University of Lampung in sustaining mangroves. The University of Lampung prefers to show accountability to the community although there is no obligation to do so because the district government is the actor who gives mandate to the University of Lampung and that accountability should address to the district government. The accountability process is held both formal and informal. To the local government and other stakeholders is in a formal way, whilst to community mostly in an informal way, through meeting and discussion at village leader house or Mangrove Lampung Centre to socialized what the University has done to mangrove ecosystem and the local community.

Meanwhile, at the lower level, the accountability process of the local community involved in mangrove groups is most of the time carried out in an informal way. The community shows their accountability to the village leader or to government officer-related mangroves (mostly to forestry management unit officers). In the community, the process of accountability is considered a responsibility. This is also common at the case study location that actors interchangeably use the term accountability to show responsibility. Meanwhile, the NGO conducted a vertical accountability process by giving reports to the actors that give authority (donors) or are superior to the NGOs.

To conclude, the study showed that there is a lack of accountability process for the stakeholders at the lower level. Government actors are recognized to do accountability upward to the office at higher levels, but not downwardly to the community. This is because the accountability process of governance actors occurred based on the formal procedure which is hierarchical to the office at higher levels (hierarchically superior). For this reason, the government officers confirmed that they do not have the responsibility to report office achievement to the community. This explains the lack of transparency in data shared (because data is kept within the office) and the lack of accountability downwardly to the community.

6.5 Inclusiveness

Inclusiveness is a process of government actors seeking input from multiple different sources (Lockwood et. al, 2010). It is important to deliver successful governance of natural resources in the complex multilevel with various involvement of agencies (Schusler et al. 2003; Hoffman et al. 2012). It is observed that Indonesia government considers inclusiveness as one of the bases for formulating the National Strategy on Mangrove Ecosystem Management (Presidential decree 73/2012). It is suggested that the government should accommodate all political commitments of the country, local, and all parties to achieve effective and efficient mangrove management. The government then referring inclusiveness in the policy direction to implement the National Strategy as a partnership or collaborative action between governments and the community or private sector as part of efforts to realize the global environmental commitment. The inclusiveness through collaboration or participation is then recommended to be applied at a lower level. Thus, many more actors are involved in mangrove management at lower levels (district and village levels) such as private consultants, NGOs, private sectors, and local community.

At the research locations, the collaboration in mangrove management between the government and local community implements through membership of mangrove group. As previously explained in chapter 5, all research locations have mangrove groups. FMU officer said, “a mangrove group is a group that can be initiated by the government to involve local community in mangrove management or by the local community that later get support and facilitate by the government”. Along with mangrove groups, the village leader mentioned there are also mangrove ecotourism groups and mangrove security groups.

The process of recruitment is based on a volunteer system without any specific criteria or requirements. But the member of the mangrove group explained that the member of mangrove group is mostly a member of the farmer group. The number of people in a mangrove group may vary between 20 or 30 people. For example, Margasari village that has two mangrove groups (Margajaya1 and Margajaya2). The mangrove group establishment was initiated by the former village leader (in 1997) that aim to empower the local community to sustain the mangrove ecosystem that was heavily degraded. FMU officers mentioned in the interviews (in February and March 2019) that many times, the government involved

mangrove groups to do mangrove planting activities. In addition, the government also empower them to manage mangrove nursery. The member of mangrove group said that they meet every two months to discuss the latest condition of mangroves and further activity on mangroves, together with the village leader and government officer (mostly with FMU officers).

However, based on interviews, the involvement of the local community is limited to the physical activities of mangrove planting and other management activities initiates by the government or other non-government actors. The collaboration did not involve the community in the decision-making process. In the process of inclusiveness, the government should give an equal chance or opportunity for the participant to give their contribution in any action implemented and decision-making process. Stokes et al. (2006) suggest that different and multiple sources are believed can give more diversity in value and awareness, as well as more structure and policies to foster contribution and engagement from stakeholders. Davidson et al. (2006) conclude that a governance system can be considered inclusive when all stakeholders who are taking part in the governance system can be equally engaged based on the rights provided to them. This is important to increase the enthusiasm of the community to participate in government activity as well as useful to foster community confidence, so in the future, the community can have more initiatives to sustain mangroves. To respond to this, the government referred to the involvement of the University of Lampung in Margasari mangrove management.

The finding observed that the position of the University of Lampung in Margasari mangrove management is almost equal to the district government that has authority in mangrove management. So, the University of Lampung is involved in the decision-making process together with local district government as well as empowers local community to be actively involved in mangrove management. Even there is a local institution established by the university namely Lampung Mangrove Centre (LMC) that is located just by the mangrove forests and aims to empower local community. The LMC is also managed by local community that has been trained through workshops by the university. Several activities are carried out by the local institutions such as empowering the local women in fish processing (salty fish) and shrimp paste, producing tea from mangrove leaves, and traditional food (dodol) from mangrove fruits. The aim of empowering local women is to balance the

dominancy of men in mangrove management as well as increase local community income through home industry. However, similar to local government at district level, the University of Lampung has also limited the involvement of local community in physical activities but not in the decision-making process.

Meanwhile, at two study locations (Gebang village and Sriminosari village), the involvement of corporations (private corporations and state-owned corporations) in mangrove management is significant. Interviews with village leaders showed that they take advantage and opportunity of the corporate social responsibility program (CSR) of the corporate located near the mangrove ecosystems. As the CSR program is about helping the neighbourhood of the corporate, the village head suggested the corporation allocate the CSR program to conserve mangrove forests. In one of the villages, the CSR program then helps the village leader develop tracking for mangrove ecotourism and provides mangroves tree seedlings to be planted in the ecotourism.

In Pahawang island, the existence of NGOs that have full commitment to mangrove rehabilitation including empowerment of local communities surrounding mangroves has drawn government attention to involving the NGO in many formal discussions to solve problem-related to mangroves. The NGOs have given their insight and suggestions based on their experience in mangrove management to the government officers. However, according to the NGO officers, as the decision was made by the government, many important things based on data on the field suggested by the NGO were not being considered or not taken into account by the government officials due to there were other interests that might be more profitable.

To conclude, mangrove governance in Indonesia is considered as inclusive. However, the involvement of non-government actors is mostly limited to the action to sustain the mangrove, for example, mangrove planting activities, mangrove nurseries, or other activities related to mangrove rehabilitation. Only a few participants such as the University of Lampung that given an opportunity to take part in the decision-making process related to mangroves. It is believed that different and multiple sources can give more diversity in value and awareness, and the governance system can be equally engaged based on the rights provided to them. This is also related to the practice of the principle of fairness.

6.6 Fairness

Indonesia's government (at the national level) through national strategy on mangrove ecosystem management considered 'fairness' as one of the basics in implementing mangrove management. However, the government refers to fairness more than the equality in responsibility and sharing the benefit of natural resources in order to realize the prosperity of all instead of including non-government actors in the decision-making process (as described above). Davidson et al. (2006) prefer to describe fairness in governance as equitable responsibilities, as well as recognition and distribution of benefits and costs. Through the fairness principle, Lockwood et al. (2010) suggest the natural resource arrangement would be more equitable, particularly in power distribution, recognition of the diversity of values, and the treatment of the participants, not only for current conditions but also for the future. Fairness should be implemented in natural resource management widely in Indonesia, because of issues related to consistency in decision making, equality in responsibility, and sharing benefit-related to mangroves at the lower level.

Based on an interview with the NGO (in March 2019), at the case study location (Pahawang island), inconsistency in decision making happened was related to the decision of the local village leader to let the investors do conversion of mangrove forest. Later, the village leader works for the investor to supervise the conversion activity. Based on interviews, together with the NGO, the village leader and local community have agreed to make mangrove forests on this island a protected conservation area. The agreement stipulated in village rule No.02/007/Perdes-phm/XI/2006 concerning mangrove forests conservation, and village rule No.03/007/KD-DPM/11.1/2006 concerning rules for the mangrove conservation area. To implement and enforce the agreed rules, the village leader, communities, and NGO through the Village Leader decree (No.04/007/KD-BPDPM/11.2/2006) established 'Mangrove Conservation Area Management Board' (*Badan Pengelola Daerah Perlindungan Mangrove/BPDPM*). Through the management board, local community capacity in mangrove management was increased. The local community obeyed the rules and stopped benefiting the forests unsustainably. However, the condition changed when the investor came and made an agreement with the village leader. The inconsistency of the village leader has resulted in the management board becoming dysfunctional and the effort to promote sustainability of mangroves failed.

In sharing responsibility for mangrove governance, government officers explained that they have too many responsibilities to cover due to overlapping regulations. Davidson et al., (2006) suggest that the principles of fairness should be implemented to develop the action and mechanism of decision-making related to sharing benefits, costs, and responsibilities. As previously discussed in Chapter 5, the authority of the forestry office is based on forestry sectoral law (law no.41/1999 related forests) is over state forests (including mangrove forests located at state forests). However, their authority become larger due to the issuance of Governor Regulation no.84/2016 that in one of the causals mentions some activities that must be done by Forests Management Unit officers related to rehabilitation of forests both state forests and other land-use areas (Area Penggunaan Lain/APL). Moreover, there are other government offices that have the authority to manage mangroves outside the state forests (at APL). FMU officers argue that they seem to be burdened with many responsibilities over areas that many institutions are authorized to manage. So, the overlapping authority over mangrove management is indicated a lack of fairness in sharing responsibility.

Meanwhile, lack of fairness in distributing or sharing the benefit of mangroves experienced by local communities near mangrove forests. Most of the rules or regulations related to mangroves (including village regulations) are prohibited local communities to take products from mangroves (especially timbers). This makes local communities feel that the rules or regulations are not fair to them. Because they suggest sustaining the forests, but on the other hand they cannot benefit the forests economically. Based on local communities' opinion, the importance of mangroves is only ecologically to prevent sea eruption and protect their village from tsunamis. Nevertheless, the local community prefers to obey the rules, even though according to the village leader, there are still a few cases of taking timber from the forests.

So, to conclude, the implementation of the principle of fairness in mangrove management at the case study locations needs to be improved in some areas of consistency in decision-making, sharing responsibility and sharing benefits.

6.7 Integration

The analysis of integration in natural resource governance refers to the connection and coordination between governance at the same level and across governance levels at different levels (Lockwood et. al. (2010). Therefore, several key points in this part are related to the coordination of government actors between and within levels, the flow of information and resource, as well as the problem of fit whether the plan, priorities, and activities of the government actors between and within levels are synchronized

In the policy direction of the national strategy on mangrove ecosystem management (Presidential decree no.73/2012), Indonesia government clearly mention that the mangrove ecosystem should be managed as part of an integrated coastal area and watershed management, and coordination between actor involved (both vertical and horizontal) are recommended to- conduct and guarantee the implementation of national strategy in mangrove ecosystem management. Nevertheless, as previously discussed in chapter 5, the coordination across sectoral only happens at national levels when the ministries involved in mangrove management conduct coordination meetings to formulate policy and arrangements on mangroves to be implemented at the lower level. Meanwhile, at lower levels, the sectoral arrangement of mangrove forest management has caused a lack of interaction and coordination between actors involved in mangrove management.

As a result of the sectoral arrangement, the flow of information and resources is only little that has been shared between sectors. This is also related to a lack of transparency in governance (as described above in the transparency section). Each government office has its own version related to the coverage and current condition of mangroves. For example, the Forestry office that mentions the current condition of mangrove forests is good, while other government offices mention that mangrove forests are heavily degraded. This happens because the authority of the forestry office is on state forests, while other government offices (Environment office and fishery office) authority are over other land use areas. Dovers (2005) suggests that in considering the interconnected nature of sustainability challenges in the management of natural resources, the governance instruments require connectivity that is functional in connecting the government at different scales, regions, as well as sectors of policies.

The lack of sharing information (because of lack of transparency) affects the implementation of many activities on mangroves, which happen in the range of mangrove planting or replanting activities conduct at the same place while many mangrove forests at different locations need to rehabilitate or restored. For example, mangrove activity is both conducted by government and non-government actors implemented at mangrove ecosystems that are well managed such as in Margasari village or Sriminosari village, while other locations where mangrove ecosystems are heavily degraded such as in Karya Makmur village.

6.8 Capability

Capability is associated with some key resources including plans, resources, skills, access, knowledge, experience, and leadership that are sufficient for the organization (Lockwood et.al., (2010). The analysis of the capability of mangrove governance starts with the government actor's skills, experience, and knowledge in managing the resource (mangrove), and the system that enables effective governance.

The government actors involved in mangrove governance have skills, experience, and knowledge in mangrove management. Particularly government actors from the Forestry office. All participants from this office have years of experience in forest management including mangroves. For example, the government officer participant from the forestry office at the provincial level has been working in the same or similar position since 2000, and the position was related to forest conservation and rehabilitation. Even though the officer used to work at the district level. Berkes et al. (2000) underline, that knowledge becomes the important key component to be capable of generating solutions to complex problems that are characterized by multidimensionality, uncertainty, time-consuming, and diversity in values. The government officers explain that to enhance the officer's knowledge and skills in the latest regulation or arrangements or technology, they were often sent to national level training, workshops, and seminars (related to forests management) that were held by the ministry or other Forestry offices from different provinces in Indonesia.

This aligns with the central government direction (through President Decree 73/2012) that the development of research, science, technology, and information systems are needed in order to increase the capacity of government officers at the regional level in implementing

the authority and obligation to strengthen sustainable mangrove ecosystem management in accordance with local conditions and aspirations. However, sometimes, the government officials sent to become a participant in workshops or seminars remains the same person. So, the new knowledge or skills are not spread equally between officers in one office.

Nevertheless, based on interviews, only a few government officers have better knowledge, skills, and experiences in mangrove management even though their current position is related to mangroves (compared to officers with long positions in mangrove management). Some government officers from other institutions have only a little experience and knowledge related to mangroves. Their obligation is to manage the coastal areas including mangroves, but since they are new in their current position, their knowledge about mangroves remains little or even none. Cooney (2004) argued that lack of knowledge might require resorting to the precautionary principle. This is what happened at the office because the officer's last position on work was not related to mangrove or coastal areas has made them careful in giving information or rather pointed out other officers with more experience. This situation is very common in the work environment of government offices at the research locations, where transfer of government officers is quite often and sometimes the process is not considering the employees' educational background or work experience

The forestry officers explain in the interviews (in February 2019) that if a new head office is chosen to lead the office, the employee must prepare themselves to be transferred to another office without any clear reason. This condition also happens when the provincial or district level has a new leader. As a result, the government officers keep pointing out or mentioning other officers' names to answer the question related to mangroves. In addition to the transfer of government officers, the former officers being transferred to another government office in many cases kept and brought along the data with them. So, the new officer or the remaining government office has no access to the data (that belongs to the office). Lawrence (2005) believes that in natural resource management, the capability of governance bodies to deliver the expected outcome is affected by responsibilities. Lack of responsibility may put the governance become insufficient.

However, based on findings, the involvement of non-government actors (as part of government inclusiveness) in mangrove governance at research locations has increased the

capability of government actors in managing mangroves. It is proven by the current condition of mangroves, for example at Margasari village, Pahawang Island, and other locations due to the involvement of the University of Lampung, NGOs, and the local community in mangrove management.

To conclude, only a few government officers at case study locations have long experience in mangrove management and are capable to handle issues on mangroves. The rotation system of human resources in government offices sometimes too often has caused officers with a lack of knowledge on mangroves to have the responsibility for mangrove management. This causes inefficiency in mangrove management. However, the involvement of non-government actors in mangrove governance at research locations has increased the capability of government actors in managing mangroves.

6.9 Adaptability

The last government principle analyzed is adaptability which refers to the acknowledgment that natural resource governance occurs in an uncertain and unpredictable environment (Lockwood et al., 2010). The analysis of adaptability relates to the ability of the governance structure in coping with any uncertainty of natural resources, the governance response to any new knowledge, as well as mitigation action to anticipate and manage any issues or problems related to mangrove management.

Indonesia's government (at national level) encourages the actors involved in mangrove management (through inclusiveness) to be more responsive to the changes in local, national, and global commitment to mangrove ecosystems. This encouragement stipulated in the policy direction of the national strategy on mangrove management and included the development of research, science, technology, and information systems needed to strengthen sustainable mangrove ecosystem management.

At district levels, the government and non-government actors always try to cope with the change in the mangrove ecosystem. Mangrove forests at one of the case study locations have been degraded in the past, and the other one remains degraded until recently.

The local community reported that the seasonal strong waves have caused the flood in the village and the mangrove trees can hold the waves yet because the trees are not big enough and the space between one tree and another is too wide. To respond to the situation, the government built a wall barrier to prevent the village, along with water gates that can be opened and closed so the seawater can still enter the mangrove forest. The gate is also useful for the fisherman to go to the sea. The local community mentions that the government is responsive to any reports from the local community. However, from the case, all the government efforts mostly relate to adaptation to the change's situation. It means before the community reported the situation, there was less effort from the government to mitigate or prevent the disaster to happen. Adaptability is an important feature in natural resource governance, particularly under the conditions of change, uncertainty, and complexity that mark natural resources (Armitage et al.2007; Plummer et al. (2012)).

In addition, the status of mangrove forests sometimes becomes constraining for officers to respond to community reports. This is related to the authority given to government offices to manage mangroves (explained in Chapter 5). For example, in Karya Makmur, the status of the forests are state forests, but the forests are converted into shrimp ponds. The community reports the problem to the environment office, while the authority is under the Forestry office. The community decided to do rehabilitation and restoration themselves; until the Forestry Management Unit officer (KPH) responds and reports the situation to the Watershed Management centre, and the office responds to the issue and help the community by providing mangrove tree seedlings to be planted by the local community. This responsive action from FMU officers has strengthened the legitimation given by the community to the officers. The government, however, should have prohibited the conversion of mangrove forests into shrimp ponds in the first place due to the mangrove forests in this area are categorized as state forests. It is important that the way governance structures seek and respond to innovation (new knowledge), governance efforts to cope with uncertainty, and the capability of individuals and structures to reflect and learn from governance performance (Lockwood et. al., 2010; Nunan, 2018).

Conclusion

To conclude, mangrove governance creates challenges mostly to accountability, transparency, and legitimacy derived from the diversity of actors involved associated with the ecosystem of mangroves, and the involvement of non-government actors. Various mechanisms for actors to achieve legitimacy have caused more actors involved in both government and non-government from different levels, along with multiple arrangements in mangrove governance. As a result, overlapping actors, authorities, and responsibilities are identified to happen. Meanwhile, in terms of transparency, the study showed a lack of transparency particularly in sharing information within and between sectors, visibility of the decision-making process resulting from a sectoral arrangement that keeps records within institutions, and lack of coordination. Lack of transparency is resulting from the formal system or procedure of accountability practice in the governance, which is hierarchical to the office at higher levels has made lack of accountability process to the stakeholders at the lower level.

In addition, the practice of principles of inclusiveness, integration, fairness, adaptability, and capability also needs to be concerned to improve governance performance. This is because all principles are related one to another. Based on the analysis, the principle of fairness particularly in involving non-government actors in the decision-making process is related to the involvement of non-government actors (inclusiveness) to sustain mangroves. In addition, the principle of inclusiveness has affected the principle of capability, because the involvement of non-government actors can enhance the capability of the government in managing mangroves. Meanwhile, the integration principle is required sharing information between actors involved in governance that is related to the practice of transparency principle. If there is a lack of transparency (in sharing data), it is difficult for government actors to integrate activity to avoid overlapping. Inclusiveness is also important in the practice of the adaptability principle. Indonesia government (at national level) encourages the actors involved in mangrove management (through inclusiveness) to be more responsive to the changes in local, national, and global commitment to mangrove ecosystems.

Chapter 7

Mangrove Governance in Practice

7.1 Introduction

This chapter analyses mangrove governance in practice, including how government and non-government actors implement various arrangements on mangroves through different activities. As discussed in Chapter 5, mangrove forests are governed by a multi-level governance system that implies the involvement of various actors in management at different administrative levels and creates coordination challenges. This chapter focuses on how activities related to mangrove governance are arranged through mechanisms including planning and implementing stages, relying on projects for mangrove management, and how conflict occurs and is resolved. Conflict and conflict resolution are important to analyze because a conflict has adverse impacts on mangroves for example destruction of mangrove forests.

The first section identifies mangrove management carried out by the government and non-government actors. Government actors are identified to rely on projects for mangrove management. These are associated with the mechanism and process of funding activity on mangroves as part of coastal rehabilitation, restoration, and/or development.

The next analysis is regarding conflict within mangroves management and how conflict is resolved. Conflicts within mangroves management are important to identify because they involved various actors from different levels. The conflicts may occur at lower levels where mangroves are located, but conflict resolution may involve actors from different levels. This is because different types of conflicts occurred require different processes and actors to resolve. These sections have interrelated one another in the analysis because mangrove governance in practice includes many actors and aspects that happened at different levels

and should be considered as one system. If one aspect failed in practice, it can affect the conduct and performance of the governance.

7.2. Government arrangement: relying on projects for mangrove management

Based on interviews with officers from various sectors, there is a particular mechanism for government institutions to get a budget to do mangrove activity which is through proposing projects. The officers further explained that the government allocates a budget (state or regional budget) for government institutions to do projects on coastal areas (including on mangroves) as part of Indonesia's coastal development. A project referred to in this research is the mechanism of the Indonesian government in carrying out activities including on mangroves as part of development. The project, however, is held following the direction of development goals and the leadership's vision and mission. So, the proposal of projects is guided by the development of work plans and experiences a number of constraints and challenges.

Some Forestry officers explained in the interviews (in February 2019) that the elected local government launched a regional development five-year strategy plan that breaks down into annual thematic plans. Government institutions should identify the theme and develop work plans to get a project. The work plans compiled by the government institutions are based on the office's main tasks and functions. For example, if one of the items in the strategic plans is coastal development that further breaks down into various thematic annual plans including coastal management, rehabilitation, and or restoration; the government institutions with authority over coastal areas have a chance to propose for the project. The work plans, however, must consist of some activities related to the theme offered.

All participants (government officers from different offices) agreed that applying for a budget for projects is tricky and competitive because the activity proposed by government institutions must fit properly to the theme offered. This is because the main theme of coastal management, for instance, can be interpreted into various activities such as restoration and rehabilitation of the degraded area, mangrove planting activity, and or construction of embankments along the coast, etc. One senior officer said, "it is important for government officers to be more observant in seeking for the opportunities for the proposal to approve, by

creating a proposal activity that is matched to a trending issue or event such as sea eruption and tsunami, and most important matches with the vision and mission of local governments and regional development" (FO01). Otherwise, the government institutions may lose the chance to get the project, due to the involvement of various government institutions in mangrove governance.

The implication of this arrangement is a lack of mangrove management activity carried out by the government. Moreover, the whole process reflected the experience of projects on mangroves that the government does not have funding for projects every year. This is because the variety of coastal development or management activities can be widely interpreted, and the government institutions that get the project must relate the project to the institution's sectoral authority and the local government's vision and mission at the level where the government offices are located. This is also related to the land-sea interface where mangroves are located which increases the number of offices that have a stake.

Furthermore, as previously explained in Chapter 5, mangrove forests at the research locations are mostly located in other purpose areas (Area Penggunaan Lain/APL), in which management and authority are shared between the Environment office and Fishery office, with sectoral arrangements overlapping and the focus is not always on the condition of the forest but can be on the fishery matters. This situation explains the fact that the condition of mangrove state forests is better than mangrove forests located in other land-use areas with shared management. According to Sudtongkong and Webb (2008), forests that fall into a state forest regime in which the forests belong to government and the communities are being restricted to access, extract, and/or manage the forests resource are mostly have better conditions.

Yet, as previously mentioned, another mechanism of a project from central government is delegation directly to a government body at a lower level without the involvement of government officials at lower level known as deconcentration or administrative decentralization. Deconcentration in literature is described as the process of dispersing responsibility from the central government to its branch offices at regional level without transferring any authority or involving government at lower levels (see Ribot, 2003; Larson, 2003, 2008). In the literature, deconcentration is argued to be the weakest form of

decentralization (Rondinelly, 1999). This is also at the implementation level. For example, in the forestry sector, the officer explained a type of project from the Ministry of Environment and Forestry that was delegated to the Watershed Management Center to be implemented at the provincial or district level. In this case, implementation involved actors from different institutions and different levels. So, as the project was implemented at district levels, the Watershed Management Centers involved Forest Management Unit (as part of the Forestry Office at district level) directly without involving actors from Forestry office at provincial levels. The officers further explained that often the projects implemented overlap with projects from local government at provincial or district level.

To conclude, government arrangements on mangroves have made the local government rely on discrete projects to secure resources for mangrove management. Long and complex stages for activity on mangroves to be implemented as part of Indonesia's development occur at different administrative levels including planning, proposing, budgeting, and implementing, whilst there is no guarantee for the activity or project proposed to be approved at the end. As the implication of relying on projects on mangrove activity, there is not always mangrove activity conducted by government institutions. This is because project offered by local government is on one big theme, for example, coastal management, and mangrove may or may not be included. Hence, the involvement of multiple institutions from different sectors that have authority over land and sea area (including mangroves) can propose activities related to coastal development, some many activities or arrangements are not always related to mangroves.

7.3 Non-government activity on mangroves

Apart from government actors, more actors are involved in mangrove governance at the research locations. The research found that many activities on mangroves are still carried out even though there is a lack of government projects on mangroves to implement. As an alternative to mangrove management, non-government actors do mangroves restoration and rehabilitation through mangrove planting (and replanting) and mangrove nurseries. This involvement of multiple actors is one of the characteristics of multi-level governance including mangrove governance.

The important role of non-government actors gets support from government institutions, for example, by providing mangrove tree seedlings to plant and establishing a mangrove nursery for mangrove groups to manage. Local communities involved in the mangrove nursery explained that the nursery is under Watershed Management Centre supervision. The development of the nursery aims to empower the local community near mangroves and promote the sustainability of mangroves through community involvement.

The mechanism of support as explained by officers from the Watershed Management Center is by allocating the budget to grow thousands of tree seedlings (including mangroves), and the local community earns payment for their effort doing the nursery. In this case, the government implements two important aspects of empowering the local community as well as inclusiveness. This is related to the literature on inclusiveness in natural resource governance can be implemented through collaborative governance (Lockwood et al., 2010). The establishment of the nursery to empower the local community is a collaboration in mangrove governance, which according to Anshell and Gash (2008) is an important method that makes government and non-government actors engage together in the process of managing public resources. The involvement of Watershed Management Centre is also showed that governance occurs at multiple levels. As the Watershed Management Centre is representative of the ministry that works at provincial levels but can reach the community at district level.

In addition to inclusiveness and empowerment of the local community, forestry officers informed in the interviews (in February 2019) that the establishment of a mangrove nursery is related to the provision of free mangrove tree seeds for the community. Many mangroves planting activities are initiated and practiced by non-government actors such as individuals, private sectors, and community groups. Therefore, the officers said that the aims of providing mangrove tree seedlings are to support community initiatives to sustain mangroves. It is also part of the government's mission to always include the community to sustain natural resources because it can be an effective way to educate the community to sustain mangroves. According to Schusler et al. (2003) and Hoffman et al. (2012), inclusiveness is important to deliver successful governance of natural resources in the complex multilevel system with various involvement of actors.

The Watershed and Forestry officers explained (in different interviews in February and March 2019) that the mechanism to ask for mangrove tree seedlings is by submitting a request letter to Watershed Management Center, by mentioning the number of trees and the location for the activity to take place; in addition, it must be signed by the village leader where the mangrove forest is located. An individual can request up to a thousand mangrove seedlings, while a community group up to five thousand. Regarding the types of trees, Watershed Management Center provides various types of trees including mangroves, such as sengon, Cempaka, Medang, acacia wood, durian, and avocado, to plant in the terrestrial forest; and mangroves such as *Rhizophora, sea cypress, brugeria, Avicennia*. Based on the number of seedlings requested, the officer concludes that community enthusiasm for sustaining mangroves is high. The officers said, "it indicates that their awareness in maintaining the environment is also high".

In addition, two procedures for people to request mangrove tree seedlings were mentioned by the officer from the Watershed Management Center, which is by sending a request letter to the Watershed Management Centre office or bringing the request letter directly to the mangrove nursery chosen by the office. However, according to some local communities, the second procedure is not familiar to the community. The people from the nursery at Sidodadi village have also mentioned a similar thing. As a result, many people must wait for a long time to get mangroves from Watershed Management Center; whilst the community that directly comes to mangrove nurseries can get the mangroves right away as long as the type of mangroves requested is available. Based on the finding, it can be concluded that the second procedure is more effective and efficient for people to get mangrove tree seedlings for planting activities. Moreover, this condition indicates that there is a lack of information shared by the government with the community which leads to a lack of transparency in government practice. Whilst in the literature, transparency is a key important principle associated with the disclosure of information, clarity, and visibility that can promote efficiency and accountability (Bellyer and Kaufman, 2005; Lockwood, 2010).

However, the research found that many mangrove planting activities carried out by the community are only part of the commemoration of historical or important events such as commemorating earth day, mangrove day, or Indonesia Independence Day. This makes many mangrove tree seedlings requested from Watershed Management Centre wasted.

According to the member of mangrove groups, people are not concerned about the mangroves. This is because after planting a few seedlings, they stop planting and hand out the rest of the seedlings to the local community or mangrove group to continue to plant. In some events, newly-planted mangroves were neglected or unattended. Furthermore, the new trees planted died due to natural causes (swept away by the waves). The village leaders explain that mangrove needs further maintenance after it has been planted, and the local community play important role in many mangrove planting activities, particularly the community that is involved in the mangrove group. In response to this condition, forestry officers mention that there is no particular institution for maintaining the mangroves once planted. The maintenance can be handled by government institutions when the budget of the project included maintenance, and there is limited time for maintenance. When there is no budget for maintenance, the newly planted mangroves are handed to mangrove groups under the supervision of forest management unit officers.

The evidence from the focus group discussions (in March 2019) at research locations shows that together with the community, the local village leader's role in mangrove rehabilitation and protection is also crucial. The community initiatives in conducting mangrove activities need support from local village leaders. Based on the findings, village leaders can mobilize the local community to participate in mangrove activity conducted. Therefore, local village leaders need to be active and have a strong commitment to sustaining mangroves.

Multiple actors in mangrove governance are clearly identified in the research locations. The research found that local leaders can establish good connections and relationships with relevant government actors and other non-government actors. Often, they have built personal networks to obtain external support and secure funding from non-government actors to mangrove management. For example, in one of the research locations, the village leader has successfully built a road to access mangroves after conducting personal negotiations with the landowner and securing funding from a company through Corporates Social Responsibility (CSR) programs; in other locations, the village leader has also benefitted the CSR program of a company to develop mangrove ecotourism, by contacting and discussing the possibility with the related company.

However, based on the findings, the mechanism of obtaining external support through village leader personal networks is vulnerable to causing an unexpecting event to happen such as misappropriation of funds, discontinuity, or unilateral termination of cooperation by the funder. Furthermore, it can affect the community's efforts to sustain mangroves. Moreover, personal networks can harm the existence of mangroves. This for example happened at one of the research locations (Pahawang island), as the NGO's officers explained in the interview (in February 2019) that some investors take advantage of a personal approach with the village leader to facilitate their plan to convert mangrove forests into shrimp ponds. Therefore, the NGO suggested that government institutions relevant to mangroves are important to regularize any form of cooperation involving key persons of the village. This situation relates to inadequate various laws and regulations issued at national, provincial, and district levels that focus to manage the whole system of mangroves (as analyzed in Chapter 5).

At the lower level, village rules are implemented in the practice of mangrove management because village rules are developed based on the needs of the community and refer specifically to mangrove management and protection. The local leader mentioned that village rules regulate mangrove management in practice including prohibiting the local community to benefit from goods from mangroves and sanctioning or penalties for violators. The rules also ensure the local community manages mangroves and exclude outsiders from accessing and benefiting from the ecosystem without permission. The village leader of Margasari village mentioned the village rules such as prohibition of taking timber (even from the dead tree) and prohibition of converting the forests into shrimp ponds

To conclude, along with government actors, multiple actors were identified to involve in mangrove governance at research locations. The important role of non-government actors in mangrove management is to support government efforts in sustaining mangroves. The activities conducted by non-government actors are varied including mangrove planting and replanting activities, mangrove nurseries, and mangrove rehabilitation and protection. These activities are important to legitimate governance and also fill the gap in government provision and provide consistency in mangrove management.

7.4 Forest Management Unit in mangrove management practice

Previously discussed in Chapter 5 (government actors), Forest Management Unit officers (FMU) have an important role in mangrove governance. In the practice of mangrove governance, FMU officers' roles are mostly related to the implementation stage of mangrove projects and managing the condition of mangrove forests in general. This is because the FMU officers' work scope is at the district level where the mangroves are located. Since 2014 the agency became the only representative of the Forestry Office at district level because due to regional law no.23/2014, the Forestry Office no longer exists at the district level (only at provincial level).

To be the only forestry agency at district level, the FMU officers have main responsibility related to terrestrial forest management. This is related to the issuance of regional law that makes FMU officers focus only on state forests including mangrove forests. Based on interviews with FMU officers, most of them agree that their main task is to ensure the condition of mangrove state forests. Therefore, when people say that many mangrove areas are degraded, the first thing to ask FMU officers is the status of the mangrove area; whether it is a state forest, or it is a forest located in other land-use areas (with shared management). The FMU officers explained that they do not want people to blame their institutions for degraded mangrove forests that are not under their authority. The FMU officers further explained that is it their responsibility to explain what the state has done to the community. Based on focus group discussion, in the practice of mangrove management, other actors (local community and village leaders) agreed that the role of FMU officers is crucial, and therefore, they always invite FMU officers in many discussions related to mangrove management to ask for the officer's opinion and suggestions. In the literature, it is suggested that the local state actor's role as daily regulators and implementers of state programs, policies, and laws gives them influence and intervention in the practice of natural resource management. This is the reason why their position is important (Cornea et al., 2017).

However, in the interviews, some FMU officers said different opinions related to their responsibility for mangroves (with both statuses of mangroves as state forests and other land use purposes). The officer said that this is related to the issuance of Governor (of Lampung Province) regulation No.84/2016 concerning the position, organization structure, and

function of Forestry Office in Lampung province. As previously discussed in Chapter 5, one of the clauses of this regulation mention that the FMU as part of the Forestry Office has to support the rehabilitation program of land and forests, by providing material/instruments and helping the implementation of the rehabilitation program of forest located at other land use areas. Funder et al. (2019), said that local government officers exercise their work based on procedures, rules, and laws implemented in the institution. Thus, when this regulation is issued, FMU officers should be actively involved in the activity on mangroves in other land use areas even though the FMU officer's responsibility is mainly on state forests.

The position of FMU officers as interface bureaucrats makes them interact with the stakeholders, not only to discuss the forest condition but also to inform the community of all the regulations or policies related to forest management. The officers explained that it was not easy to convey regulation or rules to the community as the language used is formal and sometimes the community surrounding mangroves communicate with local or traditional language. For example, most of local community at research locations prefer to speak local language, thus, the officers have to translate, explain and interpret the rules and regulations to make them understand. According to Lipsky (2010), it is common that the frontline state government is usually given by the authority a high degree of discretion in implementing rules or regulations and this enables them to devise their own rules and interpretation related to implemented rules and regulations. In addition, Funder et al. (2019) suggest that it is important for the authority to make the community understand the state interventions or regulations because at the ground level the community may be initially resistant to accepting state interventions; instead, they may reshape, resist, or even not engage with them. Based on the findings, the FMU officers can deliver information related to government rules and regulations on forests (including mangroves) to local communities, as the communities understand their rights and obligations over the forests.

In practicing daily work, FMU officers explained that they faced obstacles including a lack of personnel to handle the work, the office location that is far from home, and the condition of the office that is not representative because lack of room and desk to work properly and shared the only vehicle from the office. In one of the research locations, a lack of facilitation has made the officers schedule their time to attend the office. However, this condition is not associated with all FMU offices, because in some other areas the office is comfortable to

work in. Nevertheless, some officers do not make the condition an excuse because most of time, their job makes them have to move about from one forest to another or visit local communities to educate them have made them rarely stay at the office. According to Funder et al. (2019), the limitations faced by interface bureaucrats can influence the ability of the staff to conduct physical outreach, particularly those who work in large geographic areas. Previously discussed in Chapter 6, the load of work delegated to FMU indicates that there is inequality in responsibility in natural resource management; and to overcome this issue, the government has provided the FMU officers with sufficient incentives (money).

Apart from their job to connect state and community, as the government staff, the state bureaucrats have networks and relationships with other government actors from different institutions as well as within the institution, both senior staff in higher tiers of the office (at provincial and national levels) and peers (Hupe and Hill, 2007; Funder et al., 2019). As previously discussed in Chapter 5, formal coordination between and within actors involved in mangrove management in Indonesia is rare (almost nonexistent), whilst multiple government institutions have authority over mangrove ecosystems. The FMU agency is the only actor who does the coordination across sectors, even though the coordination is conducted mostly in informal ways. This is because several obstacles prevent formal coordination to happen such as lack of incentive, sectoral arrangement, and lack of initiatives. The informal coordination is conducted through informal meetings outside the office for example at the local village leader's office or the field. The coordination is possible to carry out because of the FMU officers' position as interface bureaucrats that according to Messer and Townsley (2003) is crucial in linking the state and resource users. The position as an interface actor (between the state and the citizen) makes them interact with all other actors involved in natural resource government (Funder et al., 2019).

Apart from the interaction between sectors, the FMU officers also interact with other officers within the institution, including senior staff in higher tiers of the office (at provincial and national levels) and peers. However, the officer mentioned that the interaction with their superior from a higher-level office is mostly to show accountability, responsibility, and coordination related to their work. For example, to report the progress of work in monthly meetings. This is as Therkildsen (2014) suggests that the mechanism of interaction is practice routines through official procedures based on the office hierarchy. However, Funder

et al. (2019) suggest that the interface bureaucrat should maintain such a network or relationship with formal and informal dimensions because some aspects such as patronage and nepotism might be found for example in the process of promotion. The FMU officers mentioned in the interviews that some of them have good relationships with FMU officers from different districts or forest registers, because they used to work together in the same district, and or they like to share work experiences.

To conclude, among the government actors involved in mangrove management at the research locations, the FMU officers are recognized to have the most role in the implementation of mangrove projects at a lower level (district and village levels). Even though the FMU's dominant responsibility is on state forests, at the study locations, the officers are also responsible for mangrove management located for other land use purposes (non-state forests). This arrangement has caused overlapping responsibility. However, despite their overlapping tasks, in practicing daily work, they face constraints related to the lack of facilities to support their work. In addition, the multiple responsibilities delegated to FMU among the involvement of various actors in mangrove management is indicated that there is inequality in responsibility in natural resource management.

7.5 Conflicts within mangrove management

A conflict is defined as a situation in which actors (can be individuals or groups) that interact feel impairment because of other actors' actions, and those feelings arise due to differences in their way of thinking, goals, and perceptions (Marfo and Schanz, 2009). Conflict or dispute is common in forest governance and management, and it occurs at different levels, dimensions, and intensities (Eckerberg and Sandstrom, 2013). Conflict within mangrove management happened at the research location differently from one place to another, in terms of the cause of conflicts, actors involved, and the mechanism is taken to manage the conflict. The similarities are the level where the conflict occurs which is at lower levels (village level), and basic key factors that triggered conflict were the unique ecosystem of mangrove ecosystem between land and sea, and the involvement of various actors with different interests in mangrove management. The conflicts that occurred namely conflict of interests, conflict within mangrove ecotourism management, and conflict of access closure

to mangroves. Conflicts within the context of mangrove management provide examples of how mangrove governance is conducted in practice.

Conflict of interest

The first conflict triggered by differences in interests of actors occurs in the 1980s in Margasari village. The uniqueness of mangrove ecosystem between the land and the sea has an array of various functions that are essential for the sustainability of the environment as well as community welfare, such as providing food for marine biota and protecting the coastal area (Spalding et al., 2010). Because of the marine biota, this area is the perfect place for shrimp cultivation. Many investors at the research locations have converted mangrove ecosystems into shrimp ponds that led to coastal eruptions. The village leader said, “twelve sub-villages were gone due to the sea eruption, along with all the shrimp ponds”. The village leader further mentioned that over time, the emerging land started to appear, and this has made the former shrimp ponds owner claim that the emerging lands were theirs (because they have land certificates). The local community explained that the former village leader initiated to stop the development of shrimp ponds in this village and stop issuing ownership of the land near mangroves. Together with the local community, the former village leader started to conduct mangrove restoration dan rehabilitation. To evidence community efforts in sustaining mangroves, the former shrimp pond owners stop the claim on the emerging land and agreed to hand out the area to the village leader.

The local communities further explained (in the FGD) that the process undertaken to achieve agreement was through discussion and negotiation, but the former village leader was also showing his power over his authority (village area). In the negotiation process, the former village leader proposed to involve a third party in the local government at district level. The third party was the University of Lampung represented by officers and lecturers involved in the coastal study center. The involvement of the third party was with the consideration that the university has no interest in converting the mangrove area for other purposes. All actors involved through mediation with the third party as a neutral actor finally agreed to hand out the mangrove ecosystem to be managed as educational forests.

Based on the explanation, the first conflict over mangrove areas occurred at the village level and was completely solved. The actor involved in the conflict came from different level which is village level and provincial level were decided to end the conflict as well as mitigate the conflict to happen in the future. In the literature related to conflict (Wilson et al., 2005; Louis et al., 2005), conflict over natural resources attend to have complex issues that mostly cannot be resolved completely, and for those reasons, the actors involved or actor that has authority prefer to manage the conflict rather than resolve the conflict.

So, the study evidence that conflict can be solved if there is willingness of all actors involved. In addition, based on the findings, the village leader was able to manage the authority power he has over village area including mangrove forests located in this village. In the literature, this situation is related to the importance to show who has power and how the power is played out in specific conflict contexts which is an important dimension of the conflict management problem (Ayling and Kelly, 1997). In addition, mediation was chosen as a procedure to resolve the conflict. In literature related to conflict, mediation is taken where positions remain inflexible (Ayling and Kelly, 1997). In this case, the former shrimp owners have the right to have their land back; on the other hand, the local village leader was more concerned about the disaster that might happen again in the future. These two inflexible situations led the actors involved to mediation with the University of Lampung and local government at district level as mediators that give power to directly intervene and make recommendations or advisory decisions. Mediation has become common in resolving resource-related disputes, and in this case, it also succeeded in resolving the conflict.

Conflict within mangrove management

The second conflict is related to the management of mangrove ecotourism in Sriminosari village. According to Ibarra and Hirakuri (2007), many problems that trigger conflict are related to local institutions that are weak and disorganized, along with formal and informal sets of rules and practices. Regarding the condition of mangrove forests, the village leader and local mangrove groups decided to develop mangrove forests as mangrove ecotourism. A local committee established to manage the ecotourism consists of local communities that have been trained by government institutions (Tourism office). According to Jacobsen and Cohen (1986), this situation is related to contested issues of mutual interest that power

relations manifest themselves, and natural resource use and management often involve such contested issues, such as who has rights of access, use, and control, when and under what conditions, etc.

A committee board member of ecotourism mentioned in the interview (in February 2019), that it has attracted many people from outside the village, and therefore, it earned income. He further explained that related to the income, some key leaders of the village started to question the allocation of the income and asked for a share because in their opinion they have the right to get a share from their contribution to the development of ecotourism. This was how the conflict started because of differences in vision related to income allocation. The man from the committee said, "as the village key leaders have strong influence and are respected by the communities at the village rather than the rest of committee members, they decided to re-elect the committee leader and propose someone who can fulfill their wish". As a result, the former leader of the committee stepped aside and handed out the post to the newly elected man; and ecotourism is now under new management.

The situation that happened at the case locations relates to the literature on conflict management that mentions that in managing conflict, power is a key dimension that is important to be considered and can control types of conflicts such as conflict of interests, control over access, and benefit or use of the natural resources (Buckles and Rusnak, 1999; Castro and Nielsen, 2003; Jacobsen and Cohen, 1986). In this case, a group of actors that have an important influence on a community can be considered as actors with power, as their influence can decide what happens to ecotourism management. Moreover, in this case, negotiation was not working to solve the conflict. Therefore, the village leader made an important decision by letting the village's key leaders do re-election.

Conflict-related access to mangroves

The third case is a conflict related to access to mangroves in Sidodadi village, Pesawaran district. The conflict was related to the closure of fishermen's access to the sea through mangrove forests because the forests have been converted into tourism areas.

The beautiful scenery of the ecosystem where mangrove forests grow has also invited people to develop tourism areas. Based on the findings, some have developed ecotourism, which gives no harm to mangrove ecosystem, but some developed tourism areas by cutting down all the mangrove trees. Additionally, the local government at district level with the reasoning of increasing the original local revenue of the district, let the investor privatize the location and convert mangrove forests in this area by hoarding the area and transforming it into a beach for recreation. According to a local community in the interview, the location was the access for fishermen to go to sea. He further explained that as the owner started to close the access, the fishermen started to protest which ended in conflict. In the end, the government interfered and solved the conflict by negotiating with the owner of the beach to let the fishermen go to the sea by opening small access through the remaining mangrove forests. When parties have an interest in seeking solutions, the chance for resolution of the conflict is greater (Agerback, 1991).

The case can be explained in the literature on conflict of management as the process of conflict resolution taken in this case is negotiation, the process in which parties meet face-to-face to solve the problems through communications (see Burton and Dukes, 1990). This procedure, however, needs a neutral third party to ensure the meetings are open, transparent, and productive which means the communication runs smoothly. In this case, the local government at district level becomes the third party that intervenes in the case to help the local community and the tourism owner sit together and discuss the possibility of re-opening the access for fishermen through the remaining mangrove forests located in the tourism area. Even though this conflict should not happen in the first place if the local government did not allow the investor to convert the mangrove area into a tourism area. Conflict management according to Blas Mola-Yudego and David Gritten (2010) is rarely successful with a single-step process, unless the conflicts are minor in scale and goodwill or the actors involved prevail.

Based on the case, the interest of the local district government was not on conservation, so the conversion happened and triggered conflict due to access closure. Due to decentralization, local governments at district level have the authority to manage natural resources within district jurisdiction. It means that the local district government has priority over the natural resources in district area, including permitting the non-government actor to

manage the coastal area. So, when the priorities are not in line with conservation efforts and the sustainability of the mangrove ecosystem, it is potential to trigger conflict as happened at one of the case study locations. Additionally, this situation is also related to the lack of transparency of the governance in the decision-making process and shared information related to the decision made. Agerbak (1991) suggests that the best outcome for conflict management in short term is communication between actors involved in the conflict to reduce tensions and increase understanding while hoping for positive signs to move forward to resolution. So, if only the government has communicated the priority of development to the community and did not permit the investor to convert the mangrove ecosystem, the conflict would not have happened.

To conclude, the conflict that occurs at the case study locations are varied such as conflict of interests, conflict within the management board of ecotourism, and conflict related to access to mangroves. As the conflict has mostly occurred at lower levels, the actors involved were also related to actors involved in mangrove management at the lower level which were the local community, local village leader, local government, and village important elements. One conflict at the research location should not have occurred in the first place if only the local government put more concern on the sustainability of mangroves rather than regional income. Three general procedures are suggested to be followed to solve conflict (Ayling and Kelly, 1997) which are collaborating planning, negotiation (Burton and Dukes, 1990), and mediation. The two last mentioned (negotiation and mediation) with the involvement of the third party were taken to solve the conflict at the case study locations. However, in one location, the key dimension in natural resource conflict which is power has been identified to be practiced by the actors who have the power to resolve conflict.

Conclusion

Based on the empirical analysis of mangrove governance in practice above, the research concludes that different arrangements in mangrove management are practiced by the government through various mechanisms. These include relying on projects to do activity on mangroves, giving responsibility to government officers (Forest Management Unit) to manage both mangroves in state forests and other land use areas, and interfering in a conflict that occurs in mangroves management when required. However, some weaknesses were

found regarding the arrangements, for example, the mechanism to do mangrove activities based on projects is competitive but does not guarantee the activity proposed is approved, as the result, the government cannot carry out mangrove management as a routine activity; second, giving many responsibilities on FMU officers has caused overlapping in responsibility and inequality in responsibility in natural resource management. In addition, some of the officers need support related to lack of facilities; third, the intervention of government actors in conflict resolutions to show government authority over the resources, whilst the source of conflict may come from governance arrangement. The intervention may not be necessary if in the first place the government put more concern into mangroves' sustainability.

Nevertheless, governance arrangements have encouraged more participation from non-government actors in mangrove management. Activities conducted by non-government actors are varied including mangrove planting and replanting activities, mangrove nurseries, and mangrove rehabilitation and protection. These activities are important to support mangrove governance in practice by filling the gap in government provision and providing consistency and continuity in mangrove management.

Regarding conflict, most conflicts at the case study locations were resolved completely through negotiation and mediation. In one location, internal conflict related to mangrove management was solved by actors identified to have power (influence).

CHAPTER 8

CONCLUSION

8.1 Introduction

This thesis examined how multi-level governance works in practice, in the context of mangrove forests in Indonesia. By applying a case study approach this thesis sought to answer the research question "governing mangroves: how does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?".

This chapter presents the concluding chapter; while findings have been discussed and analyzed in Chapter 5 related to multi-level governance arrangements, Chapter 6 related to the conduct of governance, and Chapter 7 related to mangrove governance in practice. This chapter reflects on how the research questions were answered by deploying the research methodology, research design, and analytical framework, and identifies and explains contributions to literature. The chapter is structured as follows: summary of the findings, contribution to knowledge, potential areas for further research and conclusion.

8.2 Summary of findings

This section summarizes the findings to draw conclusions in answering the research question of "How does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?"

Four sub-questions were developed in this research to answer the overall research question systematically, namely: (1) How are mangrove forest governance systems arranged in

Indonesia?; (2) How is mangrove governance conducted?; (3) How do governance actors practice mangrove management and why?.

8.2.1 Mangrove forest governance system

This section aims to answer the first sub-question related to mangrove governance arrangement in Indonesia. The findings conclude that mangrove forests are governed through multi-level governance systems, involving non-governmental as well as government actors at multiple administrative levels. The diversity of actors involved is partly attributed to mangrove forests being at the land-sea interface but also due to decentralization in Indonesia and to gaps in provision by the government, filled by non-governmental actors. Governance systems were found to be fragmented rather than coordinated and operating as holistic systems. In addition, the involvement of various actors creates coordination challenges.

Several main aspects are underlined to affect mangrove governance in Indonesia, which are administrative levels, actors involved along with the law and policies issued for their involvement, and coordination across sectors. This section is presented in several parts because governance arrangement is affected by various key aspects, namely administrative levels, actors' involvement, and the implication of both aspects that creates coordination challenges. The first section presents administrative levels.

8.2.1.1 Administrative levels

Indonesia's decentralization policy has enabled the authority and responsibility to manage mangroves to be distributed among national, provincial, district, and village levels. The authority distributed to the lower level is through the issuance of multiple laws and regulations (national, regional, and sectoral). As discussed in Chapter Five related to mangrove governance arrangements, the basic regulation for government agencies at all levels to manage mangroves is Presidential Decree No.32/1990, which declared that mangrove forests are a protection zone. To strengthen the declaration, the Indonesian government issued another Presidential Decree No .73/2012 known as the "National Strategy for Mangrove Ecosystem Management", which determined the involvement of

various government institutions to manage mangroves. Heading the implementation is the Ministry of Environment and Forestry. The aim of the strategy is to achieve sustainable mangrove ecosystems and community prosperity based on the availability of natural resources that are integrated as part of national development planning system. The presidential decree, however, fails to clearly define the roles of actors. Thus, various sectoral laws and regulations are implemented to govern the involvement of government actors at lower levels.

Apart from overseeing actors, the government arranges the mangrove ecosystem into two main parts: primarily terrestrial forests and as part of the marine environment. This arrangement is reflected in the legal mandate and authority given to mangrove management in particular at lower levels. Mangroves inside state forest zones are considered predominantly terrestrial, therefore, the government uses Forestry Law No.41/199 to regulate the forests, while the authority of the forests is under the Ministry of Environment and Forestry or under the Forestry office at lower level. On the other hand, when mangrove ecosystems are considered as part of the marine ecosystem, the regulations implemented are related to fisheries and marine resources that are relevant such as series of Laws of Ministry of Marine and Fisheries No.17/2008, No.12/2013, No.34/2014 and No.40/2014, Presidential Regulation No. 121/2012 on Rehabilitation of Coastal Areas, and Small Islands Law No. 27/2007 on Coastal Areas and Small Island Management.

As many government institutions are involved, other sectoral laws and regulations are also implemented. Additionally, Indonesia's decentralization policy allows the local government at provincial and district levels to manage natural resources in provincial and district jurisdictions. This means another set of laws and regulations are issued to govern natural resources, including mangroves. However, among the various laws and regulations to regulate mangroves, only a few pieces of legislation are specifically targeted at mangrove management and conservation, while other legislations only include mangrove management as part of coastal management. Overlapping authority has caused overlapping government responsibilities, and this includes similar activities implemented for mangroves.

As a result of the implementation of various laws and regulations, there is overlapping in authority and actors involved in mangrove governance. This situation has caused confusion, particularly for local communities.

8.2.1.2 Multiple actors' involvement

The unique location of mangroves between land and sea leads to the involvement of many actors with different responsibilities in management (Banjade et al., 2017).

As previously explained, the Indonesia government arranged the involvement of government actors through Presidential Decree No.73/2012. Based on the decree, several ministries at the national level are involved in mangrove management. The ministries delegate the mandate to govern mangroves to government institutions at lower levels that have sectoral authority on mangrove or coastal areas, namely the Forestry office, Environment office, Marine and Fisheries office, and other agencies and government bodies such as Watershed Management Centre, and Forest Management Unit agency. This contributes to the involvement of even more actors at the provincial and district levels.

Along with the government actors, the findings showed the involvement of non-government actors with different roles in mangrove management at the case study locations. Decentralization of natural resource management can accommodate various interests of local people to manage and sustain natural resources (Mahdi et al., 2017). The government consistently encourages non-government actors to take part in natural resource management (including mangrove management) by developing schemes for involvement, such as community participation, community-based mangrove management, mangrove working group, the involvement of NGOs, and private sectors. The legal mandate for non-actor government to be involved in mangrove management is given to relevant government institutions or the village leader. Most non-government actors work together with government actors, including the local community, local village leaders, NGOs, and the university.

Different interests, mechanisms, and roles are behind the involvement of non-government actors: local community involvement to secure the village from coastal disaster by actively

being involved in mangrove groups or community-based mangrove management. Since the local communities are forbidden to benefit from goods from mangrove forests, they sustain mangroves to avoid the village being affected by coastal erosion and floods; the NGO involvement is to empower the local community through workshops, facilitate them to sustain mangroves, and connect local community members to government officers. The NGO has successfully supported local government to create village rules; the university is involved because of the mandate delegated by the local district leader. The university empowered the local community by creating a mangrove center, and the village leader helps to mobilize the local community to be actively involved in mangrove management and support government officers to sustain the mangroves.

To conclude, the role of government actors is important in governance arrangements, while non-government actors' role is to support and enhance the government arrangement in sustaining mangrove ecosystem through various mechanisms.

8.2.1.3 Challenge of coordination

Overlapping authorities and regulations are a serious concern in mangrove management in Indonesia. In terms of legal authority, as mangroves are located in coastal areas and/ or small outlying islands, in Indonesia the authority on this area is under the Ministry of Marine Affairs and Fishery jurisdiction (based on Law no. 27/2007 related to coastal and small islands management), however, as the mangroves fall into state regime forests, the authority on mangroves goes to Ministry of Environment and Forestry. Therefore, the mangrove trees are under forestry management, while the coastal area where mangrove grows is under marine affairs and fishery management. In literature, the management of mangrove forests under state management is usually under management of many sectors (Banjade et al., 2017). It means that rather than put the focus only on forestry sectors, the regulations, laws, and policies implemented in coastal management are also required for fishery, marine, environment, and land use sectors (Friess et al., 2016).

This situation has led to confusion among actors involved in defining mangrove forests whether as marine or primarily terrestrial. This is related to different laws and regulations applied if the mangrove forest is in an area that belongs to marine ecosystems and terrestrial

forests. The confusion occurs during implementation, for example, when related to who should be responsible for the whole area particularly when the area is degraded. There is a lack of coordination between actors who wield authority over the area. All parties are confused due to the lack of clear roles in implementation for each of them. This is compounded because the involvement of more government agencies means implementation of more sectoral laws and regulations (Chapter 5). Yet, as mentioned above, among the various legal mandates for government actors (laws and regulations), only a few pieces of legislation (three in total) are specifically targeted at mangrove management and conservation. These are Presidential Decree No.31/1990 concerning the importance of mangroves as protection zones, Presidential Decree No.73/2012 on the national strategy of mangrove ecosystem management, and the Minister of Environment Regulation Number 201/2004 regarding the criteria and standards for determining mangrove exploitation. Meanwhile, the other legislations only include mangrove management as part of coastal area management.

However, although each government agency's role is ostensibly defined in sectoral laws or regulations, in practice the government actor's roles are unclear. This is because many sectoral laws and overlapping jurisdictions create challenges related to coordination across government offices. In addition, as each government office focuses on its sectoral framework or arrangement, the government does not conduct activities on mangroves every year. In fact, most activities are conducted by non-government actors. They bear no national authority, policy, or regulation, except that in particular locations non-government actors are permitted to carry out mangrove activity which is at another land use area (not inside the state forests). In addition, as explained in Chapter 5, there are village rules that mostly become the benchmark in the use of mangrove forests by the local community.

The previously cited overlapping jurisdictions are a major challenge to coordination across government offices involved in mangrove management. This situation is common in a multi-level governance system, as there are multiple actors and levels with interaction between actors at different levels is problematic (Mwangi and Wardell, 2012). Nunan (2018) suggests two processes of interactions that have been recognized in multi-level governance, horizontal interaction (within levels) and vertical interaction (between levels). The existence of horizontal interactions is beneficial to facilitate cooperation and coordination between

actors at any level, whilst vertical interactions facilitate the flow of resources, information, and decisions up and down the system (Nunan, 2018).

There is evidence of interaction and coordination conducted in an informal way by Forestry Management Unit officers. According to Funder et al. (2019), their position as an interface bureaucrat has made it possible to interact and coordinate with other government and non-government actors that have interests in mangrove management, but these interactions are mostly conducted through informal ways such as small discussions at the village hall, communal square or the village leader's residence. Mostly, officers discuss the condition of mangroves and activities of mangrove groups or familiarize the community with regulations from the government.

However, formal coordination between actors was not found to be conducted. Even though the creation of the 'National Strategy for Mangrove Ecosystem Management' aims to establish and enhance integration and coordination across relevant sectors involved in mangrove governance, in practice there is not any interaction or coordination across sectors at the case study locations. The findings show that most actors involved in mangrove management realized that it was difficult to interact and coordinate to broach the subject of mangrove management across different sectors. Several factors underlie this situation. First, the government actors operate and implement mangrove management based on their own sectoral legal frameworks, known as 'Tuppoksi' or main task and function. Second, in the sectoral framework of the government offices, there is a mechanism of accountability that is structured upwardly, with no mechanism of budget disbursement and consequently no incentive or budget allocation to do cross-sectoral coordination or interaction. Third, the issue of lack of initiatives to interact formally and coordinate activities for both government and non-government actors. In relevant literature, it is argued that coordination, as one of the key features in management of coastal areas, can be expected to bring better understanding and cooperation between multiple stakeholders, particularly in addressing a wide range of issues in coastal management and development (Thia-Eng, 1993).

As a result of the lack of coordination and interaction between actors, there are overlapping and duplicated responsibilities and roles within government. The situation has affected

activity involving mangroves implemented by the government that is most similar in the range of mangrove planting activities carried out in the same place.

The answer to the first sub-question can be concluded that mangrove management in Indonesia is carried out through multi-level governance, because it involves governance from different levels (national, provincial, district and village levels), involves multiple actors, government actors from different institutions, and non-government actors. The role of government actors is important in governance arrangement, while non-government actors, namely local community, NGOs, village leaders, and the university, the role is to support the government in sustaining mangroves through various mechanisms. Multiple arrangements through the issuance of various laws and regulations in the governance system. This governance system has caused ambiguity among the actors involved related to defining whether mangrove forests are part of marine or primarily terrestrial, and whose actor should be responsible for the mangrove. The mangrove governance complexity caused by overlapping laws and regulations has led to another challenge of coordination and interaction. The presence of some factors that prevent coordination to happen has been recognized, which are sectoral framework or arrangement, budget allocation, and lack of initiatives. Nevertheless, the overlapping regulations, actors, and levels are not followed by a high number of activities in the mangrove ecosystem every year. Moreover, at operational practice or implementation of mangrove management at the case study locations (at lower level), none of the national authorities, policies, or regulations that have been used.

8.2.2 The conduct of mangrove governance

This section answers the second sub-question related to how mangrove governance is conducted. The research employed eight governance principles promoted by Lockwood et al. (2010) to examine the conduct of mangrove governance. The research found that multi-level governance creates challenges to legitimacy, transparency, and accountability that are exacerbated in the case of mangrove forests due to the diversity of actors involved, the mangrove ecosystem associated with the land-sea interface, and the involvement of non-government actors.

The findings related to legitimacy demonstrate several ways that actors achieve legitimacy in mangrove management. The multi-level governance system has affected the mechanism of actors to gain legitimacy. Most government officers earn legitimacy from the institutions through legislation enacted by the government at a higher level or local government leaders at the same level. Multiple laws and regulations are issued to legitimize government institutions from central government, provincial government, district government and sectoral within institutions. The result of this mechanism is many government institutions are legitimated to manage mangroves, which means the involvement of more actors.

Another mechanism suggested for actors to achieve legitimacy is through electoral processes, particularly for government actors (Boedeltje and Cornips, 2004), which is mostly found in a country with democratic decentralization system (Lockwood, 2010). This mechanism is related to the decentralization system adopted by the Indonesian government. This mechanism is evident, particularly at lower levels of provincial and district levels. The local leader at provincial and district levels received legitimacy through election processes in the democratic system every five years. The chosen leader has the authority to manage natural resources including mangroves under their jurisdiction. Through this effort, the government actors are recognized by the community to have authority in mangrove management. As the local government has the authority to manage mangroves, this also means that the local government can recruit more actors to be involved in mangrove management. Thus, this system results in more actors and arrangements.

Outcome legitimacy becomes the third mechanism recognized at the case study locations for the actors that have contributed in sustaining mangroves to get legitimation. The stakeholders recognized and legitimated actors that, according to them, show the most concern and effort for mangroves. For example, it happened at two case study locations, where the involvement of non-government actors in their effort to sustain mangroves led to the local community believing the mangroves belonged to these actors. This type of legitimacy is known as outcome legitimacy because the actor's effort has produced a better outcome (Newman et al., 2004; Boedeltie and Cornips, 2004).

Transparency is the second principle of concern in mangrove governance. Several key features to be included in transparency are visibility, clarity, and availability (Lockwood et

al., 2010). Based on the findings, however, none of those features were found in the governance system and practice. The research showed that the involvement of various institutions in mangrove governance currently has hindered access to information from each sector or institution. This is particularly true at lower levels (provincial and district levels). The reasons behind this include government actors keeping their own records, with information systems at provincial and district levels often general or piecemeal, and of poor quality. As the governance happens at different levels, the data related to mangrove conditions at provincial levels is often different at the district level.

The problem in transparency includes visibility related to the process of decision-making and clarity related to laws and regulations. On many occasions, the officers simply answered that the regulation made by the institution at a higher level and their duty is only implemented at lower levels without any clarifying details. For example, these may be to answer the stakeholders' questions related to regulations that let conversion of mangrove ecosystems into tourism areas, and regulations pertaining to access to mangrove ecosystems.

Sharing information between government institutions involved in mangrove governance is another issue. The findings reveal that there is a lack of sharing of information between and within sectors due to coordination problems. As previously discussed, there is no evidence of structured coordination between and within sectors. The government actors argue that the sectoral arrangements have made sharing information impossible to do because each office assumed that the data and information should be kept within the office, along with the report of projects or activities that are mostly for internal purposes. Thus, the three features of transparency need to be increased in implementation at the case study location. This is due to the fact that transparency, along with accountability, in general, can effectively contribute to the development of the governance outcome (Meija Acosta, 2013).

In terms of accountability, the study has shown that there is a lack of accountability process for the stakeholders at the lower level. Accountability has been defined as the principal requirement for actors to receive power or authority as well as answers for actions they have undertaken (Greiber and Baig, 2010); it can be distinguished between horizontal, vertical, or diagonal accountability (Stapenhurst and O'Brian, 2005). Government actors are recognized as performing accountability upward to the office at higher levels, but not downwardly to

the community. This is because the accountability process of governance actors occurred based on the formal procedure which is hierarchically deferential to the office at higher levels (hierarchically superior). For this reason, the government officers confirmed that they do not have responsibility to report the office achievement to the community.

To conclude, mangrove governance creates challenges to accountability, transparency, and legitimacy derived from the diversity of actors involved associated with the ecosystem of mangroves, and the involvement of non-government actors. Various mechanisms for actors to achieve legitimacy have caused the involvement of more actors, both government and non-government, along with multiple arrangements in mangrove governance. Meanwhile, in terms of transparency, the study showed it was lacking, particularly in sharing information within and between sectors, and the visibility of the decision-making process resulting from a sectoral arrangement that keeps records within institutions, compounded by lack of coordination. Regarding accountability, the formal procedure for accountability implemented in Indonesia which is hierarchical to the office at higher levels (hierarchically superior) has led to the lack of an accountability process for the stakeholders at the lower level.

8.2.3 Mangrove governance in practice.

This section answers the sub-question related to governance arrangement and strategies in practicing mangrove management. The sub-question refers to governance in practice, including how the government implements the arrangement and strategies in sustaining mangroves, and the role of the Forest Management Unit in mangrove management practice. The findings on mangrove governance in practice have been discussed in Chapter 7. These include how mangrove activity is carried out, the role of interface bureaucrat, and conflict management.

The findings show that mangrove forests in Indonesia are governed through different arrangements and contexts. Governance arrangements at national levels are implemented in coastal areas at regional levels. Additionally, there is another arrangement from provincial and district levels governments. The government allocates budget (state or regional budget) for government institutions to execute projects in coastal areas (including mangroves) as part

of Indonesia's coastal development. A project referred in this research is the mechanism of Indonesian government in carrying out activities including on mangroves as part of Indonesia's development. The project is held in accordance with the direction of development goals and the leadership's vision and mission. So, projects are not given by the government (at provincial or district levels) directly to government institutions to be implemented, rather government institutions should propose the projects.

So, in this case, the local government has to rely on discrete projects to secure resources for mangrove management due to leadership and inconsistent prioritization of mangrove forests. Long and complex stages for activity on mangroves to be implemented as part of Indonesia's development occur at different levels including planning, proposing, budgeting, and implementing, whilst there is no guarantee for the activity or project proposed to be approved at the end.

As an implication of relying on projects on mangrove activity, there is not always mangrove activity conducted by government institutions. This is because the projects are allocated within one big theme, for example, coastal management, and mangrove may or may not be included. In addition, because many institutions within different sectors with authority over land and sea area (and mangroves) can propose activities related to coastal development, there are many activities or arrangements that are not always related to mangroves.

However, the lack of government projects on mangroves does not mean that there is a complete dearth of activity. As an alternative to mangrove management, non-government actors do mangrove restoration and rehabilitation through mangrove planting (and replanting) and establishing mangrove nurseries. This is important to fill the gap in government provisions and provide consistency in mangrove management. The important role of non-government actors gets support from government institutions by providing mangrove tree seedlings for planting.

8.2.3.1 The role of interface bureaucrat (Forest Management Unit Agency)

The second aspect of mangrove governance in practice is the role of interface bureaucrats, in this case, the Forestry Management Unit (FMU) officers.

FMU officers play an important role in mangrove management, particularly in state forests. The research found interesting facts about FMU officers related to coordination that become a deep concern in mangrove governance. As outlined previously that formal coordination between and within actors involved in mangrove management in Indonesia is rare (almost nonexistent), while multiple government institutions have authority over mangrove ecosystems. The FMU agency stands as the only actor who undertakes coordination across sectors, even though coordination is conducted mostly in informal ways. This is because there are several obstacles that prevent formal coordination such as lack of incentives, sectoral arrangements, and lack of initiatives. Informal coordination was conducted through meetings outside the office for example, at the local village leader's office or in the field. The coordination is possible because of the FMU officers' position as interface bureaucrats; according to Messer and Townsley (2003), it plays an important role in particularly in linking the state and resource users. Their position as interface actors (between the state and the citizenry) leads them to interact with all other actors involved in natural resource governance (Funder et al., 2019).

The FMU officer's role is mostly related to the implementation stage of mangrove projects or management of forests in general including mangrove forests at the lower level. This is because the Forest Management Unit agency's work scope is at the district level where the mangroves are located. In addition, the agency became the only representative of the forestry office at the district level because Regional Law Nno.23/2014 removed the forestry office from the district level (only at provincial level).

Regarding challenges in doing daily work, it can be concluded that the biggest obstacle facing FMU officers faced is related to lack of facilities to support their work, such as an inadequate office, vehicle, and the location of the office that is relatively far from their residences. In addition, the officers that work based at district levels must often coordinate and report to the forestry office at provincial levels. The limitation has influenced the ability of the staff to conduct physical outreach, particularly those who work in a large expanse of area (Funder et al., 2019).

8.2.4 Conflicts within mangrove management

In mangrove governance, conflict is a possibility in practice. A conflict is defined as a situation in which actors (either individual or group) experience impairment because of actions of other actors, and those feelings arise due to differences in their way of thinking, goals, and perceptions (Marfo and Schanz, 2009). Conflict or dispute is common in forest governance and management, and it occurs at different levels, dimensions, and intensities (Eckerberg and Sandstrom, 2013). The research found that conflicts within mangrove management at the case study locations are different from one place to another in terms of cause of conflicts, actors involved, and mechanisms took to manage the conflict. The similarity is only in the level where the conflict occurs, which is at lower levels (village level).

Based on the findings, key triggers of conflicts at the case study locations were the unique ecosystem of mangrove ecosystems between land and sea and the involvement of various actors with different interests in mangrove management. The conflicts that occurred were conflict of interests, conflict within mangrove ecotourism management, and conflict of access closure to mangroves.

Regarding actors, the research found that the involvement of many actors that caused conflict were mostly non-government actors including investors, important figures in the village, and local community. Non-government actors with various interests in mangroves have led to degradation of the ecosystem. This is closely related to the location of mangroves.

The uniqueness of the mangrove ecosystem between land and sea provides has an array of functions that are essential for sustainability of the environment as well as community welfare, such as providing food for marine biota and protecting the coastal area (Spalding et al., 2010). Due to its marine biota, this area is ideal for shrimp cultivation. Many investors at the research locations have converted the mangrove ecosystem into shrimp ponds led to coastal erosion. On the other hand, the beautiful natural scenery has led to tourism development. Ecotourism sites do no harm to the mangrove ecosystem, but other tourist projects have destroyed the mangroves. Both the development of shrimp farms and tourism areas have caused conflict due to environmental damage and detrimental effects on the local

community. For example, at the case study locations, the conversion of mangroves to shrimp farms brought about coastal erosion and flooding for sub-villages. At another location, the conversion of mangrove forests into tourism areas barred access for local fishermen. The conflict would not have occurred if the district government explicitly put concerned about the sustainability of mangroves in the development planning.

Castro and Nielsen, (2003) suggest that another emerging key dimension to be considered in natural resource conflict and management is 'power', in particular how it is played out in specific conflict contexts as an important dimension to the conflict management problem. This is related to contested issues of mutual interest when power relations manifest themselves, and natural resource use and management often involve such contested issues, including who has rights of access, use, and control, when and under what conditions, etc. (Jacobsen and Cohen, 1986).

Nevertheless, as the interest of local district government was not in conservation, the conversion happened and triggered conflict. Due to decentralization, local governments at the district level have the authority to manage natural resources within the district jurisdiction. It means that the local district government also is entitled to have priority to give permission to non-government actors to manage the coastal area. So, when the priorities are not in line with conservation efforts and the sustainability of the mangrove ecosystem, therein lies potential to trigger conflict. Additionally, this situation is also related to lack of transparency of the governance in the decision-making process and shared information related to the decisions. The government did not familiarize the development priorities within the community and handed permission to the investor to convert the mangrove ecosystem.

Apart from the cause of conflicts, the mechanism of conflict resolution is also important to underline. This is to find out how mangrove governance solves the conflict. As the conflict happens mostly at the lower level (village), the actors who solved it were also within government institutions that have authority over mangroves at lower level and local village leaders. Some of the conflicts were resolved through negotiation, while some are through mediation with the involvement of the third party. Mediation has become common to resolve resource-related disputes, conducts by giving third party power to directly intervene and

make recommendations or, in the case of arbitration, to make a binding or advisory decision (Ayling and Kelly, 1997). Burton and Dukes (1990) underline that a neutral third party is needed for disputes that can be resolved through communication to ensure the meetings are open, transparent, and productive.

At one of the research locations, the third party received the mandate to manage the mangrove area when the conflict was resolved. Another conflict was also resolved amicably to the mutual benefit of both parties. It is recognized that all the conflicts were resolved by the involvement of government actors as a mediator.

8.3 Contribution to knowledge

The research makes several contributions to knowledge, in relation to: (1) dedicated mangrove management plans tend to be fragmented through sectoral implementation, (2) this sectoral implementation leads to mangrove governance being aligned to sectoral priorities and ways of working, (3) the practice of multi-level governance in the context of decentralization leads to challenges for accountability, and (4) the mechanisms and incentives for mangrove management affect practice and outcomes.

The first contribution is related to sectoral implementation which makes mangrove management tend to be fragmented. Whilst national policy and strategies for the sustainable management or conservation of mangrove forests provide a framework specifically for mangrove forest management, this becomes fragmented once it trickles down to implementing agencies. This is because the implementation of national mangrove forest policies and strategies is undertaken by several sectors and levels of government. This is not uncommon in the context of governance in the land-sea interface, as found in a systematic review of literature by Pittman and Armitage (2016). This research makes a contribution to knowledge by providing detailed evidence and implications of fragmented governance for the sustainable management of mangrove forests and explains why governance at the local level tends to be fragmented.

The second contribution is the adoption of government strategy that is interpreted based on sectoral arrangement. So, in addition to governance of mangrove forests being fragmented,

the sectoral adoption of elements of an overall national mangrove management strategy means that the strategy is adapted to sectoral priorities and ways of working, which may not necessarily be appropriate or ideal for the context of mangrove forests.

The third contribution is the practice of multi-level governance in the context of decentralization leads to particular challenges for accountability. The context of decentralization in Indonesia, which takes the form of Napoleonic administration, presents challenges through the existence of regional (central) and decentralized government at the local level, resulting in multiple and competing mechanisms and practices of accountability. In the context of mangrove forests, the multiple sectors of government involved exacerbate an already complex situation of accountability.

The fourth contribution is based on the finding that interface bureaucrats rely on projects to fund and enable activity associated with the management of mangrove forests in Indonesia implying that understanding of the incentives motivating and enabling the work of bureaucrats is essential. This can be contributed to the literature related to interface bureaucrats (Funder et al, 2019). Incentives influence what bureaucrats can do, what they have the remit and funding to do and so what kind of work is undertaken. Understanding of these incentives will help explain the priorities and activities for mangrove management and gaps in management practice.

8.4. Future directions

There are some possible directions in which this study could be extended. Here is a brief outline of areas that I consider to be particularly important.

1. Greater understanding is needed of the opportunities for, and complexities of, accountability within the context of multi-level governance, particularly in situations of fragmented governance.
2. In relation to coordination of policy and practice between sectors and levels, research could investigate further the challenges of, and opportunities for, greater coordination. Knowledge on how greater coordination could be encouraged,

undertaken, and sustained could enhance the practice of sustainable natural resource governance.

3. Research into the forms and practice of partnerships between actors for mangrove governance and the use of demonstrations of governance and management practices are needed.
4. Regarding power, how power dynamics affect the arrangements and practice of multi-level governance requires further theorization and empirical investigation.

8.4 CONCLUSION

This thesis analyses mangrove governance in Indonesia. It was conducted by drawing on the concept of multi-level governance, governance principles, decentralization in natural resources, and conflict within natural resource management. In drawing literature on these areas, this research sought to answer the research question "how does the multi-level, multi-actor governance landscape affect the practice and conduct of mangrove governance in Indonesia?".

This research was presented through three main analysis aims to answer the sub-questions which are: (1) How are mangrove forest governance systems arranged in Indonesia?; (2) How is mangrove governance conducted?; (3) How do governance actors practice mangrove management and why?.

Regarding the first sub-question, this research found that mangrove forests in Indonesia are governed by different arrangements and contexts. Government actors are critical to governance arrangements, that involvement is through the issuance of various laws and regulations from central government and sectoral institutions. Meanwhile, the involvement of non-government actors, including non-governmental organizations (NGOs), local communities, and a university is with different roles and interests. Their role in mangroves is recognized can fill gaps in government provision and providing consistency in mangrove management. However, the involvement of various actors at different levels has led to coordination challenges. The analysis shows that mangrove governance requires greater dedicated attention by aligning the practice of governance with dedicated policy and strong

coordination mechanisms developed across government sectors involved in mangrove management.

The second sub-questions were answered based on the findings that multi-level mangrove governance creates challenges to legitimacy, transparency, and accountability that are exacerbated in the case of mangrove forests by the diversity of actors involved, associated with the land-sea interface and the involvement of non-government actors. Various mechanisms to get legitimacy on mangrove management have made many actors involved in the governance along. However, the stakeholders are only legitimate actors that have real contributions to sustaining mangroves. Meanwhile, in terms of transparency, the study showed lack of transparency particularly in sharing information within and between actors, and visibility of the decision-making process resulting from sectoral arrangements that keep records within institutions, and lack of coordination. Whilst accountability is conducted through a formal procedure implemented in Indonesia which is hierarchical to the office at higher levels (hierarchically superior). This has made lack of accountability process to the stakeholders at lower level.

The third sub-question related to mangrove governance in practice is answered based on findings that local governments relied on discrete projects to secure resources for mangrove management due to inconsistent leadership and prioritization of mangrove forests. As an implication of this situation, there is not always mangrove activity every year practiced by government institutions. However, there is an alternative for activities on mangroves to be carried out by non-government actors.

Overall, the research concludes that the multi-level, multi-actor governance landscape affects the practice and conduct of mangrove governance in Indonesia. This occurs through the implementation of various laws and regulations from the national, regional, and sectoral to govern authorities and the involvement of government actors that in practice cause overlapping, issues in accountability, legitimacy, and transparency, and create challenges of coordination.

REFERENCES

Adger, W.N., Brown, K., Tompkins, E.L., 2005. The political economy of cross-scale networks in resource co-management. Ecology and Society,10(2): 9

Agerbak, L., 1991. Breaking the cycle of violence: doing development in situations of conflict. *Development in Practice*, *1*(3), pp.151-158.

Agrawal, A., 2001. The Regulatory Community: Decentralization and the Environment in the Van Panchayats (Forest Councils) of Kumaon, India, *Mountain Research and Development* 21(3).

Agrawal, A. and J.C. Ribot, 1999. Accountability in Decentralization: A Framework with South Asian and African Cases, *Journal of Developing Areas* 33.

Alcorn, J.B., Luque, A., Weisman, W., Suralaga, D., Singh, S., Zeballos, R., Rodriguez, L., Murombedzi, J., Huskova, B., Rothschild, D. and Murphree, M., 2005. Non-governmental organizations and protected areas governance. In *Governance Stream of the Vth World Park Congress* (pp. 1-44). Canada, Parks Canada and IUCN World Commission on Protected Areas (WCPA) Ottawa and Gland.

Aligica, P.D., 2014. *Institutional diversity and political economy: The Ostroms and beyond*. Oxford University Press.

Alongi D., 2002. Present State and Future of the World's Mangrove Forests. Environmental Conservation 29(03):331 – 349. DOI:10.1017/S0376892902000231

Alongi, D. (2008). Mangrove forests: resilience, protection from tsunamis, and responses to global climate change. Estuarine, Coastal and Shelf Science, 76(1), 1-13.

Alongi, D. M. (2014). Carbon Cycling and Storage in Mangrove Forests. Annu. Rev. Mar. Sci, 6, 195–219. https://doi.org/10.1146/annurev-marine-010213-135020.

Andersson, K.P., Gibson, C.C. and Lehoucq, F., 2004. The politics of decentralized natural resource governance. *PS: Political Science & Politics*, *37*(3), pp.421-426.

Andersson, K.P., Ostrom, E., 2008. Analyzing decentralized resource regimes from a polycentric perspective. Policy Sciences, 41(1): 71–93.

Andreula, Nicolo; Chong, Alberto; Guillen, Jorge., 2009. Institutional Quality and Fiscal Transparency. IDB Working Paper Series, No. IDB-WP-125

Armitage, D., 2002. Socio-institutional dynamics and the political ecology of mangrove forest conservation in Central Sulawesi, Indonesia, Global Environmental Change, 12, 203–217.

Armitage, G., 2008. Governance and the commons in a multi-level world. International Journal of the Commons, 2(1): 7–32

Andersson, K. and Gibson, C. C. 2006. "Decentralized Governance and Environmental Change: Local Institutional Moderation of Deforestation in Bolivia." *Journal of Policy nalysis and Management.* (26)1:99–123.

Ansell, C. and Gash, A., 2008. Collaborative governance in theory and practice. *Journal of public administration research and theory*, *18*(4), pp.543-571.

Ayling, R.D. and Kelly, K., 1997. Dealing with conflict: natural resources and dispute resolution. *The Commonwealth Forestry Review*, pp.182-185.

Bebbington, A., Dharmawan, L., Fahmi, E. and Guggenheim, S. 2006. "Local Capacity, Village Governance and the Political Economy of Rural Development in Indonesia." *World Development.* (34)11:1958–1976.

Blaikie, P. 2006. "Is Small Really Beautiful? Community-based Natural Resource Management in Malawi and Botswana." *World Development.* (34)11:1942–1957.

Baggio. R., Pil Wm., Boeger WA., 2011. Genetic evidence for multiple paternity in the mangrove land crab Ucides cordatus (Decapoda: Ocypodidae). July 2011. Marine Biology Research 7(5):520-524.DOI:10.1080/17451000.2010.528771. https://www.researchgate.net/publication/230934554_Genetic_evidence_for_multiple_paternity_in_the_mangrove_land_crab_Ucides_cordatus_Decapoda_Ocypodidae

Banjade, M.R., Liswanti, N., Herawati, T. and Mwangi, E., 2017. 2017. Governing mangroves: unique challenges for managing Indonesia's coastal forests. Coastal forests."

Baxter P., and Jack S., 2008. Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers. The Qualitative Report volume 13. Pages: 544-559

[Bakosurtanal] Badan Koordinasi Survey dan Pemetaan Nasional. 2009. Peta Mangroves Indonesia. Cibinong: Pusat Survey Sumber Daya Alam Laut Badan Koordinasi Survey dan Pemetaan Nasional.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. The Qualitative Report, 13(4), 544-559. Retrieved from http://www.nova.edu/ssss/QR/QR13-4/baxter.pdf

Baumann, P., 2000. *Sustainable livelihoods and political capital: Arguments and evidence from decentralisation and natural resource management in India* (p. 136). London: Overseas Development Institute.

Beatty, S., Molony, B. and Morgan, D., 2002. Mitigation of negative impacts on fish and fisheries values during remedial works at Waroona Dam.

Bell, E. and Bryman, A., 2007. The ethics of management research: an exploratory content analysis. *British journal of management*, *18*(1), pp.63-77.

Benz, A., 2010. The EU's competences: The 'vertical'perspective on the multilevel system.

Bergman, M. M. (2010). "On Concepts and Paradigms in Mixed Methods Research." Journal of Mixed Methods Research 4(3): 171-175.

Berg, B. L. & Howard, L. (2012). Qualitative Research Methods for the Social Sciences. (8th ed). USA: Pearson Educational Inc.

Berkes, F., 1989. Common property resources: ecology and community-based sustainable development.

Berkes, F., Kislalioglu, M., Folke, C. and Gadgil, M., 1998. Minireviews: exploring the basic ecological unit: ecosystem-like concepts in traditional societies. *Ecosystems*, *1*(5), pp.409-415.

Berkes, F., Folke, C. and Colding, J. eds., 2000. *Linking social and ecological systems: management practices and social mechanisms for building resilience*. Cambridge University Press.

Berkes, F., 2008. Commons in a multi-level world. *International journal of the commons*, *2*(1), pp.1-6.

Berkes, F. and Ross, H., 2016. Panarchy and community resilience: Sustainability science and policy implications. Environmental Science & Policy, 61, pp.185-193.

Biela, J. and Papadopoulos, Y., 2014. The empirical assessment of agency accountability: A regime approach and an application to the German Bundesnetzagentur. *International Review of Administrative Sciences*, *80*(2), pp.362-381.

Bixler, R.P., Wald, D.M., Ogden, L.A., Leong, K.M., Johnston, E.W. and Romolini, M., 2016. Network governance for large-scale natural resource conservation and the challenge of capture. *Frontiers in Ecology and the Environment*, *14*(3), pp.165-171.

Blaikie, N., 2018. Confounding issues related to determining sample size in qualitative research. *International Journal of Social Research Methodology*, *21*(5), pp.635-641.

Blundo, G., 2014. Seeing like a state agent: The ethnography of reform in Senegal's forestry services. In *States at Work* (pp. 69-89). Brill.

Blomquist, W., 2009. Multi-level governance and natural resource management: The challenges of complexity, diversity, and uncertainty. In: Beckmann, V., Padmanabhan, M. (Eds.), Institutions and Sustainability. Springer, Dordrecht. pp. 109–126.

Bodin, Ö., Crona, B.I., 2009. The role of social networks in natural resource governance: What relational patterns make a difference? Global Environmental Change, 19(3): 366–374.

Boedeltje, M., and Cornips, J., 2004. Input and output legitimacy in interactive governance, NIG Annual Work Conference, Rotterdam (No. NIG2-01), [online] available from http://hdl.handle.net/1765/1750

Brannen, J. (1992). Mixing methods: Qualitative and quantitative research. London: Avebury. (Reprinted) Brewerton, P.M. and Millward, L.J., 2001. *Organizational research methods: A guide for students and researchers*. Sage.

Brett E.A., 2003.Participation and Accountability in Development Management. December 2003. Journal of Development Studies 40(2). DOI:10.1080/0022038041233129374 7

Britten, N. 1995, 'Qualitative research: Qualitative interviews in medical research',British Medical Journal, Online, 22 July, pp.311-251. Retrieved 21 March 2008 from http://www.bmj.com/cgi/content/full/311/6999/251

Bryman, A., 1988. Quantity and Quality in Social Research. London, Routledge.

Bryman, A., 2007. "Barriers to Integrating Quantitative and Qualitative Research." Journal of Mixed Methods Research 1(1): 8-22.

Bryman, A., 2012. *Social research methods*. Oxford, Oxford University Press.

Brown, O. and Keating, M., 2015. Addressing Natural Resource Conflicts. *Working Towards More Effective Resolution of National and Sub-National Resource Disputes, Chatham House*.

Bovens, M., 2007. Analysing and Assessing Accountability: A Conceptual Framework. European Law Journal 13(4): 447-468.

Buckles, D. and Rusnak, G., 1999. Conflict and collaboration in natural resource management. *Buckles, D. 1999. Cultivating Peace: Conflict and Collaboration in Natural Resource Management, 1-12. Ottawa, ON, Canada: IDRC/World Bank.*

Burgess, H. and Burgess, G., 1996. Constructive confrontation: A transformative approach to intractable conflicts. *Mediation quarterly*, *13*(4), pp.305-322.

Campbell, B., J. A. Sayer, P. Frost, S. Vermeulen, M. Ruiz Pérez, A. Cunningham, and R. Prabhu. 2001. "Assessing the Performance of Natural Resource Systems." *Conservation Ecology.* (5)2:22. http://www.consecol.org/vol5/iss2/art22.

Campese, J., 2016. Natural Resource Governance Framework Assessment. Guide: Learning for Improved Natural Resource Governance, IUCN/CEESP NRGF Working Paper. IUCN and CEESP, Gland.

Cash, D. W., W. N. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young., 2006. Scale and cross-scale dynamics: governance and information in a multilevel world. Ecology and Society 11(2): 8. [online] [online] URL: http:// www.ecologyandsociety.org/vol11/iss2/art8

Castro, A.P. and Nielsen, E. eds., 2003. *Natural resource conflict management case studies: an analysis of power, participation and protected areas*. Rome: Food and Agriculture Organization of the United Nations.

Clark, J.R., 1996. Coastal Zone Management Handbook. CRCPress, Boca Raton, FL

Chusak W. and Vandergeest, P., 2010. The politics of decentralization: natural resource management in Asia

Colfer, C.J.P. and Capistrano, D., 2005. The politics of decentralization. *Forests, People and Power. Earthscan, London*.

Conroy, C., Rai, A., Singh, N. and Chan, M. (1998) Conflicts Affecting Participatory Forest Management: Some Experiences from Orissa (Revised Draft) (unpublished) Chatham: Natural Resources Institute.

Corrigan CC., 2014. Breaking the resource curse: Transparency in the natural resource sector and the extractive industries transparency initiative, Resources Policy, Volume 40, 2014, Pages 17-30, ISSN 0301-4207, https://doi.org/10.1016/j.resourpol.2013.10.003. (https://www.sciencedirect.com/science/article/pii/S0301420713000846)

Creswell, J.W., 2014. *Qualitative, quantitative and mixed methods approach*. Sage.

Creswell, J.W., Hanson, W.E., Clark Plano, V.L. and Morales, A., 2007. Qualitative research designs: Selection and implementation. *The counseling psychologist*, *35*(2), pp.236-264.

Crona, B. I., and J. N. Parker., 2012. Learning in support of governance: theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance. Ecology and Society 17(1): 32. http://dx.doi. org/10.5751/ES-04534-170132

Dale, P.E.R., Knight, J.M. and Dwyer, P.G., 2014. Mangrove rehabilitation: a review focusing on ecological and institutional issues. *Wetlands ecology and management*, *22*(6), pp.587-604.

Daniels, S.E., Walker, G.B., 1997. Collaborative learning and land management conflict. In: Miina, S. (Ed.), Conflict Management and Public Participation in Land Management. EFI Proceedings, vol. 14. European Forest Institute, Finland, pp. 13–36

Darlington, Y. and Scott, D., 2020. *Qualitative research in practice: Stories from the field*. Routledge.

Darkoh, M.B. and Mbaiwa, J.E., 2009. Land-use and resource conflicts in the Okavango Delta, Botswana. *African Journal of Ecology*, *47*, pp.161-165.

Datta, D., Chattopadhyay, R.N. and Guha, P., 2012. Community based mangrove management: A review on status and sustainability. *Journal of environmental management*, *107*, pp.84-95.

Davidson, J., Lockwood, M., Curtis, A., Stratford, E. and Griffith, R., 2006. Governance principles for regional natural resource management. *Pathways to good practice in regional NRM governance*.

De Herdt, T. and Titeca, K. eds., 2019. *Negotiating public services in the Congo: State, society and governance*. Zed Books Ltd.

Delli Priscoli, J. (1990), "From Hot-Tub to War: Alternative Dispute Resolution in the U.S. Army Corps of Engineers," in W. Viessman and E.T. Smerdon (eds.), Managing Water-Related Conflicts: The Engineers Role, ASCE, N.Y., pp. 70-93.

Devine, F. (1995), Qualitative Analysis, in D. Marsh and G. Stoker (eds.), Theory and Methods in Political Science, Macmillan Press, London

Denscombe, M., 2010. Ground rules for social research: guidelines for good practice. 2nd ed. New York: Open University Press.

De Vaus, D., 2001. Research design in social research, Sage.

De Vaus, D. A., 2014. Surveys in Social Research. (6th ed). Australia: UCL Press.

Diani M. and McAdam (eds.)., 2003. Social Movements and Networks: Relational Approaches to Collective Action, Oxford University Press, Oxford.

Dietz, T., Ostrom, E. and Stern, P.C., 2003. The struggle to govern the commons. *science*, *302*(5652), pp.1907-1912.

Djogo, T. and Syaf, R., 2003, June. Decentralization without accountability: power and authority over local forest governance in Indonesia. In *Issues of decentralization and federation in forest governance: proceedings from the Tenth Workshop on Community-based Management of Forestlands* (pp. 9-25).

DG of Watershed Management and Protected Forest, Ministry of Environment and Forestry., 2019. Rehabilitasi Mangrove dalam Rangka Pengelolaan Ekosistem Lestari. Workshop Pengelolaan Mangrove Berkelanjutan Dengan Pendekatan Berbasis Ekosistem :Potret Upaya Konservasi Dan Rehabilitasi Di Indonesia. Purwokerto, 19 Agustus 2019.

Doornbos, M., A. Saith, and B. White (Eds.). 2000. Forests: Nature, people, power. Oxford, UK: Blackwell.

Dovers S. 2005. Environment and Sustainability Policy: Creation, Implementation, Evaluation. Federation Press: Sydney.

Duke, Norman C., Jan-Olaf Meynecke, Sabine Dittmann, Aaron M. Ellison, Klaus Anger, Uta Berger, Stefano Cannicci et al. "A world without mangroves?". *Science* 317, no. 5834 (2007): 41-42.

Eckerberg, K. and Sandström, C., 2013. Preface to forest conflicts: a growing research field. *Forest Policy and Economics*, *33*, pp.3-7.

Eisenhardt, K.M., 1991. Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management review*, *16*(3), pp.620-627.

Eisenhardt, K.M. and Graebner, M.E., 2007. Theory building from cases: Opportunities and challenges. *Academy of management journal*, *50*(1), pp.25-32.

Febryano, I.G., Suharjito, D., Darusman, D., Kusmana, C. and Hidayat, A., 2014. The roles and sustainability of local institutions of mangrove management in Pahawang Island. *Jurnal Manajemen Hutan Tropika*, *20*(2), pp.69-76.

Food and Agriculture Organization (FAO)., (2007). The world's mangroves 1980–2005. Rome: Food and Agriculture Organization of the United Nations

Friess AD., 2017. Ecotourism as a Tool for Mangrove Conservation. Sumatra Journal of Disaster, Geography and Geography Education 1(1): 24-35.

Friess D.A., Thompson B., Brown., Amir A.A., 2016. Policy Challenges and approaches for the conservation of mangrove forest in Southeast Asia. https://www.researchgate.net/publication/304394253_Policy_challenges_and_approaches_for_the_conservation_of_mangrove_forests_in_Southeast_Asia

Friess, D.A., 2017. Mangrove rehabilitation along urban coastlines: a Singapore case study. *Regional Studies in Marine Science*, *16*, pp.279-289.

Funder, M. and Mweemba, C.E., 2019. Interface bureaucrats and the everyday remaking of climate interventions: Evidence from climate change adaptation in Zambia. *Global Environmental Change*, *55*, pp.130-138.

Fung, A. and Wright, E.O., 2001. Deepening democracy: Innovations in empowered participatory governance. *Politics & society*, *29*(1), pp.5-41.

Glasl, F., 1999. Confronting Conflict: A First-aid Kit for Handling Conflict. Howthorn Press, Gloucestershire.

Giesen, W.; Wulffraat, S.; Zieren, M.; Scholten, L. Mangrove Guidebook for Southeast Asia; FAO Regional Office for Asia and the Pacific: Bangkok, Thailand, 2007.

Gibbs, M.T., 2008. Network governance in fisheries. Marine Policy, 32(1): 113–119.

Gibson, C.C., Ostrom, E., Ahn, T.K., 2000. The concept of scale and the human dimensions of global change: A survey. Ecological Economics, 32(2): 217–239.

Gilman, E.L., Ellison, J., Duke, N.C. and Field, C., 2008. Threats to mangroves from climate change and adaptation options: a review. *Aquatic botany*, *89*(2), pp.237-250.

Giri, C., Ochieng, E., Tieszen, L. L., Zhu, Z., Singh, A., Loveland, T., Duke, N., 2011. Status and distribution of mangrove forests of the world using earth observation satellite data. Global Ecology and Biogeography, 20, 154–159.

Gómez-Vázquez, I., Álvarez-Álvarez, P. and Marey-Pérez, M.F., 2009. Conflicts as enhancers or barriers to the management of privately owned common land: A method to analyze the role of conflicts on a regional basis. *Forest Policy and Economics*, *11*(8), pp.617-627.

Gray, B., 2003. 'Framing of environmental disputes. In: Lewicki, R., Gray, B., Elliott, M. (Eds.), Making Sense of Intractable Environmental Conflicts: Concepts and Cases. Island Press, Washington, DC, pp. 11–34.

Grimble, R. and Wellard, K., 1997. Stakeholder methodologies in natural resource management: a review of principles, contexts, experiences and opportunities. *Agricultural systems*, *55*(2), pp.173-193.

Guba, E. G. & Lincoln, Y. S., 1994. Competing Paradigms in Qualitative Research. In Denzin, N. K. & Lincoln, Y. S. eds; The SGAE Handbook of Qualitative research. (1st ed). California: SAGE Publication: pp105-117

Gupta, A., 2006. Blurred boundaries: the discourse of corruption, the culture of politics and the imagined state: a reader. Am. Ethnol.22(2),211.

Hafner, J., Schlarb, M. and Pinili, L., 2003. Community-based natural resource conflict management: the case of watershed planning in Metro Cebu, the Philippines. *Natural resource conflict management case studies: an analysis of power, participation and protected areas*, *19*.

Hakim, Catharine, Research Design:Strategies and Choices in the Design of Social Research, 1987: London, Unwin Hyman, pages 61 - 75.

Hall, D. and Hall, I., 1996. Issues in Methodology. In *Practical Social Research* (pp. 28-55). Palgrave, London.

Hamilton, S. E., & Casey, D., 2016. Creation of a high spatio-temporal resolution global database of continuous mangrove forest cover for the 21st century (CGMFC-21). Global Ecology and Biogeography, 25(6), 729-738. doi:10.1111/geb.12449.

Hartini, S., Saputro, G. B., Yulianto, M., & Suprajaka. (2010). Assessing the used of remotely sensed data for mapping mangroves Indonesia. International Conference on Electric Power Systems, High Voltages, Electric Machines, International Conference on Remote Sensing - Proceedings, 210–215.

Heltberg, R., 2001. Determinants and impact of local institutions for common resource management. *Environment and Development Economics*, *6*(2), pp.183-208.

Hirschman, Albert O. (1994), "Social Conflicts as Pillars of Democratic Market Society," Political Theory, 22 (May), 203–18.

Hoang Hao Tra My and ShinyaTakeda. Decentralization in Mangrove Restoration: A Critical Analysis – Case study in Central Coast of Vietnam. 2015. An international academic conference 5-6 June 2015, Chiang Mai University Conference. Paper No. 50

Hogl, K., 2002. Patterns of multi-level co-ordination for NFP-processes: learning from problems and success stories of European policy-making. *Forest Policy and Economics*, *4*(4), pp.301-312.

Hue, L.T.V, & Scoott, S., 2008. Coastal Livelihood Transitions: Socio-Economic Consequences of Changing Mangrove Forest Management and Land Allocation in a Commune of Central Vietnam. Journal of Geographical Research, 46(1), 62–73.

Hupe, P. and Hill, M., 2007. Street-Level bureaucracy and public accountability. *Public administration*, *85*(2), pp.279-299.

Huxham, C. and Vangen, S., 2004. Doing things collaboratively: realizing the advantage or succumbing to inertia?. *IEEE Engineering Management Review*, *32*(4), pp.11-20.

Ibarra, E. and Hirakuri, S.R., 2007. Institutional conflict and forest policy effectiveness: The case of the Costa Rican institutional reform. *Forest Policy and Economics*, *9*(6), pp.591-601.

Idrissou, L., Aarts, N., Av, P., Leeuwis, C., 2011a. The discursive construction of conflict in participatory forest management: the case of the Agoua forest restoration in Benin. Conserv. Soc. 9 (2), 119.

Idrissou, L., van Paassen, A., Aarts, N., Leeuwis, C., 2011b. From cohesion to conflict in participatory forest management: the case of Ouémé Supérieur and N'Dali (OSN) forests in Benin. For. Policy Econ. 13 (7), 525–534

Islam, M.S. and Wahab, M.A., 2005. A review on the present status and management of mangrove wetland habitat resources in Bangladesh with emphasis on mangrove fisheries and aquaculture. Aquatic biodiversity II, pp.165-190.

Iftekhar, M.S. and Saenger, P., 2008. Vegetation dynamics in the Bangladesh Sundarbans mangroves: a review of forest inventories. Wetlands Ecology and Management, 16(4), pp.291-312.

Ingold, K., 2011. Network structures within policy processes: Coalitions, power, and brokerage in Swiss climate policy. *Policy studies journal*, *39*(3), pp.435-459.

Imperial, M.T., 2005. Using collaboration as a governance strategy: Lessons from six watershed management programs. *Administration & Society*, *37*(3), pp.281-320.

ITTO. 2012. Mapping Mangroves. ITTO Tropical Forest. Update Volume 21 No.2.ITTO, Yokohama Japan.

Jacobsen, C. and Cohen, A., 1986. The power of social collectivities: Towards an integrative conceptualization and operationalization. *British Journal of Sociology*, pp.106-121.

Jentoft, S., 2000. Legitimacy and disappointment in fisheries management. Marine Policy, 24(2): 141–148.

Jentoft, S., Mikalsen, K.H., Hernes, H.K., 2003. Representation in fisheries co–management. In: Wilson, D.C., Raakjær Nielsen, J., Degnbol, P. (Eds.), The Fisheries Co-management Experience.

Kairo JG, Dahdouh-Guebas F, Bosire J, Koedam N (2001) Restoration and management of mangrove systems—a lesson for and from the East African region. S Afr J Bot 67:383–389

Kant, S. and Cooke, R., 1999. Jabalpur district, Madhya Pradesh, India: minimizing conflict in joint forest management. In *Cultivating peace: conflict and collaboration in natural resource management*. IDRC, Ottawa, ON, CA.

Kathiresan, K., & Rajendran, N., 2005. Coastal mangrove forests mitigated tsunami. Estuarine, Coastal and Shelf Science, 65, 601–606. https://doi.org/10.1016/j.ecss.2005.06.022.

Katsikeas, C.S., Samiee, S. and Theodosiou, M., 2006. Strategy fit and performance consequences of international marketing standardization. *Strategic management journal*, *27*(9), pp.867-890.

Kolstad I. and Wiig A., 2008. Political Economy Models of the Resource Curse: Implications for Policy and Research. January 2008. ResearchGate.

Koppell, J. G. (2005). Pathologies of accountability: ICANN and the challenge of "multiple accountabilities disorder". Public administration review, 65(1), 94-108.

Krott, M. (2005). Forest policy analysis. Dordrecht: Springer.

Kuhn, T.S., 1962. The structure of scientific revolutions. Chicago Uni. Chicago Press.

Kumar, A., Poonia, M.P., Pandel, U. and Jethoo, A.S., 2011. FMEA: Methodology, design and implementation in a foundry. *Int. J. Eng. Sci. Technol*, *3*(6), pp.5288-5297.

Kusmana C. 2011., Management of Mangrove Ecosystem in Indonesia. Journal of Natural Resources. Pages 152-152.

Kusmana, C., 2014. Distribution and current status of mangrove forests in Indonesia. In I. Faridah-Hanum, A. Latiff, K. R. Hakeem, & M. Ozturk (Eds.), Mangrove ecosystems of Asia (pp. 37–60). New York: Springer.

Kustanti A., Nugroho B., Nurrochmat RD., dan Okimoto Y., 2014. Evolusi Hak Kepemilikan dalam Pengelolaan Ekosistem Hutan Mangrove Di Lampung Mangrove Center. Jurnal Risalah Kebijakan Pertanian dan Lingkungan 1(3): 143-158.

Larson, A.M., Soto, F., 2008. Decentralization of natural resource governance regimes. Annual Review of Environment and Resources, 33(1):213–239. Available at SSRN: https://ssrn.com/abstract=1319919

Larson, A.M., Ribot, J.C., 2004. Democratic decentralisation through a natural resource lens: An introduction. European Journal of Development Research, 16(1): 1–25.

Lebel, L., 2012. Governance and coastal boundaries in the tropics. *Current Opinion in Environmental Sustainability*, *4*(2), pp.243-251.

Leedy, P. & Ormrod, J. E., 2014. Practical Research Planning and Design. (10th ed). Edinburgh: Pearson Educational Inc.

Leventhal, G.S., 1980. What should be done with equity theory?. In *Social exchange* (pp. 27-55). Springer, Boston, MA. Lincoln, Y.S. and Guba, E.G., 1990. Judging the quality of case study reports. *Internation Journal of Qualitative Studies in Education*, *3*(1), pp.53-59.

Lipsky, M., 2010. *Street-level bureaucracy: Dilemmas of the individual in public service*. Russell Sage Foundation.

Litvack, J.I., Ahmad, J. and Bird, R.M., 1998. *Rethinking decentralization in developing countries*. World Bank Publications.

Lockwood, M., Davidson, J., Curtis, A., Stratford, E., Griffith, R., 2010.Governance principles for natural resource management. Society and Natural Resources, 23(10): 986–1001.

Louis, W.R., Taylor, D.M. and Douglas, R.L., 2005. Normative influence and rational conflict decisions: Group norms and cost-benefit analyses for intergroup behavior. *Group Processes & Intergroup Relations*, *8*(4), pp.355-374.

Mahardhika, S.M., Saputra, S.W. and Ain, C., 2018. Valuasi ekonomi sumberdaya ikan dan ekowisata mangrove di Muara Angke, Jakarta. *Management of Aquatic Resources Journal (MAQUARES)*, *7*(4), pp.458-464.

Mahdi, S., Rubianty, D. and Yusnadi, A., 2017. Enterprising Gampong: The Role of BKPG and Village Fund in Developing BUMDES in South Aceh, Indonesia.

Mandondo, A., 2000. Forging (un) democratic resource governance systems from the relic of Zimbabwe's colonial past. *Institute of Environmental Studies, University of Zimbabwe, and Center for International Forestry Research. Mimeo*.

Marfo, E. and Schanz, H., 2009. Managing logging compensation payment conflicts in Ghana: Understanding actor-empowerment and implications for policy intervention. *Land use policy*, *26*(3), pp.619-629.

Marshall, G.R., 2015. Polycentricity and adaptive governance. *a paper presented to the panel "The new polycentricity*.

Matzdorf, B., Sattler, C., Engel, S., 2013. Institutional frameworks and governance structures of PES schemes. Forest Policy and Economics,37: 57–64

Matthews, B., and Ross, L., 2010. Research methods: a practical guide for the social sciences. England: Pearson Education Limited.

Maxwell, J. A., 2013. Qualitative Research Design: An Interactive Approach. (3rd ed). London: SAGE Publication.

May, T., 2001. Social research: issues, methods, and process**.** 3rd ed. Buckingham: Open University Press

Mbaiwa, J.E., 2005. Wildlife resource utilisation at Moremi Game Reserve and Khwai community area in the Okavango Delta, Botswana. *Journal of environmental management*, *77*(2), pp.144-156.

McDermott, C.L., 2014. REDDuced: From sustainability to legality to units of carbon—The search for common interests in international forest governance. *Environmental Science & Policy*, *35*, pp.12-19.

McGinnis, M.D., 1999. *Polycentricity and local public economies: Readings from the workshop in political theory and policy analysis*. University of Michigan Press.

McQueen, R.A., and Knussen, C. 2002. Research Methods for Social Science: A Practical Introduction. Harlow: Prentice Hall

Meija Acosta., 2013.The Impact and Effectiveness of Accountability and Transparency Initiatives: The Governance of Natural Resources. Andrés Mejía Acosta, First published: 02 August 2013. https://doi.org/10.1111/dpr.12021

Melana, D.M., Atchue III, J., Yao, C.E., Edwards, R., Melana, E.E. and Gonzales, H.I., 2000. Mangrove management handbook. *Department of Environment and Natural Resources, Manila, Philippines through the Coastal Resource Management Project, Cebu City, Philippines*, *55*.

Metcalfe, L. (2001), 'Reforming European governance: old problems or new principles?', International Review of Administrative Sciences,67 (3), 415–43

Michels A. and Graaf de Laurens. 2010. Examining Citizen Participation: Local Participatory Policy Making and Democracy.August 2010. Local Government Studies 36(4). DOI:10.1080/03003930.2010.494101

Ministry of Environment Republic of Indonesia Indonesia., 2010. Second National Communication Under the United Nations Framework Convention on Climate Change (Ministry of Environment Republic of Indonesia, 2010).

McGinnis, M.D. and Ostrom, E., 2012. Reflections on Vincent Ostrom, public administration, and polycentricity. *Public Administration Review*, *72*(1), pp.15-25.

Mola-Yudego, B. and Gritten, D., 2010. Determining forest conflict hotspots according to academic and environmental groups. *Forest Policy and Economics*, *12*(8), pp.575-580.

Moore, P., Greiber, T. and Baig, S., 2010. Strengthening Voices for Better Choices. *Forest governance and law enforcement: Findings from the field'(Forest Conservation Programme, IUCN, 2010)*.

Moore, S.A. and Rockloff, S.F., 2006. Organizing regionally for natural resource management in Australia: reflections on agency and government. *Journal of Environmental Policy & Planning*, *8*(3), pp.259-277.

Mwangi E., Banjdae M.R., Mshale B., Herawati T., Listiwanti N., Lawry S., 2017. Mangrove Governance and Tenure: Insight for Policy and Practice from Selected Sites in Indonesia, Tanzania and Global. Center for International Forestry Research.

Mwangi, E. and A. Wardell., 2012. Multi-Level Governance of Forest Resources. International Journal of the Commons 6(2):79–103. https://www.researchgate.net/publication/307757113

Murdiyarso, D., Purbopuspito, J., Kauffman, J. B., Warren, M. W., Sasmito, S. D., Donato, D. C., Kurnianto, S. (2015). The potential of Indonesian mangrove forests for global climate change mitigation. Nature Climate Change, (July), 8–11. https://doi.org/10.1038/nclimate2734.

Morris, T. and Wood, S., 1991. Testing the survey method: continuity and change in British industrial relations. *Work, Employment and Society*, *5*(2), pp.259-282.

Nuesiri, E.O., 2016. Decentralised forest management: towards a utopian realism. *The Geographical Journal*, *182*(1), pp.97-103.

Nunan, F., 2018, August. Navigating multi-level natural resource governance: An analytical guide. In *Natural Resources Forum* (Vol. 42, No. 3, pp. 159-171). Oxford, UK: Blackwell Publishing Ltd.

O'Brien, M., Stapenhurst, R. and Johnston, N. eds., 2008. *Parliaments as peacebuilders in conflict-affected countries*. World Bank Publications.

Ostrom E., 1990. *Governing the Commons. The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press.

Ostrom E., 1995. Self-Governance and Forest Resources. Center For International Forestry Research. Website: http://www.cgiar.org/cifor

Ostrom, V., 1999. Polycentricity (part 1). *Polycentricity and local public economies*, pp.52-74.

Ostrom E., 2001, "Decentralization and development: the new Panacea" in K. Dowding et alii (eds.), Challenges to Democracy: Ideas, Involvement and Institution, Plagrave Publishers, New York, pp. 237-256.

Ostrom, E. 2005. Understanding institutional diversity. Princeton University Press, Princeton, New Jersey, USA.

O'Toole K., and Neil Burdess., 2005. Governance at community level: Small towns in rural. Australian Journal of Political Science, volume 40, pages 239 – 254.

Oudenhoven, A. P. E. van, Siahainenia, A. J., Sualia, I., Tonneijck, F. H., Ploeg, S. van der., Groot, R. S. de., Alkemade, R. & Leemans, R. (2015). Effects of different management regimes on mangrove ecosystem services in Java, Indonesia. Ocean and Coastal Management, 116, 353-367.

Pahl-Wostl, C., 2009. A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environmental Change, 19(3): 354–365.

Parker, E. and Thornton, J., 2007. Fiscal centralisation and decentralisation in Russia and China. *Comparative Economic Studies*, *49*(4), pp.514-542.

Patton, M.Q., 1990. *Qualitative evaluation and research methods*. SAGE Publications, inc.

Peluso, N., 2002. Some Questions about Violence and Decentralization: A Preliminary Exploration of the Case of Indonesia, Paper presented at the WRI's Workshop on Decentralization and the Environment, Bellagio, Italy, February 18-22, 2002.

Peters, B. G., Pierre, J. 2004. Multilevel governance and democratics: a Faustian bargain? In: Bache, I., Flinders, M. (Eds.). Multilevel governance. Oxford University Press, (pp. 75-89)

Piattoni, S., 2009. Multi-level governance: a historical and conceptual analysis. *European integration*, *31*(2), pp.163-180.

Plummer, R., Crona, B., Armitage, D.R., Olsson, P., Tengö, M. and Yudina, O., 2012. Adaptive comanagement: a systematic review and analysis. *Ecology and Society*, *17*(3).

Poteete, A., 2012. Levels, scales, linkages, and other 'multiples' affecting natural resources. International Journal of the Commons,6(2):134–150.

Poteete, A.R. and Ostrom, E., 2004. Heterogeneity, group size and collective action: The role of institutions in forest management. *Development and change*, *35*(3), pp.435-461.

Primavera, J.H. and Esteban, J.M.A., 2008. A review of mangrove rehabilitation in the Philippines: successes, failures and future prospects. *Wetlands Ecology and Management*, *16*(5), pp.345-358.

Priyanto. 2012. Dalam berita: 48% hutan 'mangrove' di Lampung rusak. Harian Lampung Post. Diakses melalui web pada 28 Agustus 2013, pukul 4:17 WIB. http://watala.org/new/?p=156. 1 halaman

Provan, K. G., and P. Kenis. 2007. Modes of network governance: structure, management, and effectiveness. Journal of Public Administration Research and Theory 18(2):229-252. http://dx.doi. org/10.1093/jopart/mum015

Punch, K. F., 2005. Introduction to social research: quantitative and qualitative approaches. 2nd ed. London: Sage

Poteete, A., 2012. Levels, scales, linkages, and other 'multiples' affecting natural resources

Poteete, A. and Ostrom, E., 2004. An Institutional Approach to the Study of Forest Resources. Manuscript available at http://www.indiana.edu/~workshop/papers/W01I-8.pdf

Rahmayani H. 2015. Ekowisata Mangrove Sebagai Kawasan Perlindungan Sumberdaya Alam Dan Nilai Budaya Di Bandar Bakau Kota Dumai. Jurnal Jom FISIP 2(1): 1-15.

Resosudarmo, I.A.P., 2002. Closer to People and Trees: Will Decentralization Work for the People and the Forests of Indonesia? Paper presented at the WRI's Workshop on Decentralization and the Environment, Bellagio, Italy, February 18-22, 2002.

Ribot, J.C., 1999. Decentralization and Participation in Sahelian Forestry: Legal Instruments of Central Political-Administrative Control, *Africa* 69(1).

Ribot, J.C., 2002. Democratic Decentralization of Natural Resources: Institutionalizing Popular Participation. World Resources Institute, Washington, DC.

Ribot, J.C., 2003. Democratic decentralisation of natural resources: Institutional choice and discretionary power transfers in sub-Saharan Africa. Public Administration and Development, 23(1): 53–65.

Richards, D. R., & Friess, D. A. (2016). Rates and drivers of mangrove deforestation in Southeast Asia, 2000–2012. Proceedings of the National Academy of Sciences, 113(2), 344–349. https://doi.org/10.1073/pnas.1510272113.

Rittel, H.W. and Webber, M.M., 1973. Dilemmas in a general theory of planning. *Policy sciences*, *4*(2), pp.155-169.

Robins, G., Bates, L. and Pattison, P., 2011. Network governance and environmental management: conflict and cooperation. *Public Administration*, *89*(4), pp.1293-1313.

Robson, C. (2002). Real World Research: A Resource for Social Scientists and Practitioner-Researchers. (2nd ed). USA: Blackwell Publishing.

Qurniati, R., Hidayat W., Kaskoyo H, Firdasari, and Makoto Inoue., 2016. Social Capital in Mangrove Management: A Case Study in Lampung Province, Indonesia. Journal of Forest and Environmental Science Vol. 33, No. 1, pp. 8-21, February 2017 https://doi.org/10.7747/JFES.2017.33.1.8

Rondinelli, D.A., Nellis, J.R. and Cheema, G.S., 1983. Decentralization in developing countries. *World Bank staff working paper*, *581*, pp.13-28.

Rosenau, P.V., 2000. *The strengths and weaknesses of public-private policy partnerships* (Vol. 94, pp. 217-242). MIT Press, Cambridge, MA. The Politics of Self-Governance.

Sattler, C., Schröter, B., Meyer, A., Giersch, G., Meyer, C. and Matzdorf, B., 2016. Multilevel governance in community-based environmental management: a case study comparison from Latin America. *Ecology and Society*, *21*(4).

Saunders M., Lewis P., Thornhill A., 2007. Research Methods for Business Students. Pearson.

Scarlett, L., McKinney, M., 2016. Connecting people and places: The emerging role of network governance in large landscape conservation. Frontiers in Ecology and the Environment, 14(3): 116–125.

Schusler, T.M., Decker, D.J. and Pfeffer, M.J., 2003. Social learning for collaborative natural resource management. *Society & natural resources*, *16*(4), pp.309-326.

Schillemans, T., 2008. Accountability in the shadow of hierarchy: The horizontal accountability of agencies. *Public Organization Review*, *8*(2), p.175.

Springer, J., 2016. Initial design document for a natural resource governance framework. IUCN/CEESP NRGF Working Paper. IUCN and CEESP, Gland, Switzerland.

Spalding, M.D., Kanuma, M., Collins, L., 2010. World Atlas of Mangroves. Earthscan, London.

Spalding, M., (2010). World Atlas of Mangroves (1st ed.). Routledge. https://doi.org/10.4324/9781849776608

Spalding M., Kainuma M., & Collins L., 2010. World Atlas of Mangroves. September 2010. DOI:10.4324/9781849776608 Publisher: Earthscan, with International Society for Mangrove Ecosystems, Food and Agriculture Organization of the United Nations, The Nature Conservancy, UNEP World Conservation Monitoring Centre, United Nations Scientific and Cultural Organisation, United Nations University. ISBN: 781136530968

Stokes, G., 2006. Critical theories of deliberative democracy and the problem of citizenship. In *The search for deliberative democracy in China* (pp. 53-73). Palgrave Macmillan, New York.

Stratford E., and Davidson J., 2003. Capital assets and intercultural borderlands: Socio-cultural challenges for natural resource management. January 2003. Journal of Environmental Management 66(4):429-40. DOI:10.1006/jema.2002.0597. Source PubMed

Suškevičs Monica., 2012. Legitimacy Analysis of Multi-Level Governance of Biodiversity: Evidence from 11 Case Studies across the EU. July 2012.Environmental Policy and Governance 22(4) DOI:10.1002/eet.1588 https://www.researchgate.net/publication/239811406_Legitimacy_Analysis_of_Multi_Level_Governance_of_Biodiversity_Evidence_from_11_Case_Studies_across_the_EU

Sudtongkong, C., and E. L. Webb. 2008. Outcomes of state- vs. community-based mangrove management in southern Thailand. Ecology and Society 13(2): 27. [online] URL: http://www.ecologyandsociety.org/vol13/ iss2/art27/.

Suman, D.O., 2019. Mangrove management: challenges and guidelines. In *Coastal Wetlands* (pp. 1055-1079). Elsevier.

Sunyowati D, Hastuti L, Butar-Butar F (2016) The Regulation of Sustainable Mangroves and Coastal Zones Management in Indonesia. J Civil Legal Sci 6: 220. doi: 10.4172/2169-0170.1000220

Taylor M. Community Participation in the Real World: Opportunities and Pitfalls in New Governance Spaces. *Urban Studies*. 2007;44(2):297-317. doi:10.1080/00420980601074987

Termeer, C.J.A.M., Dewulf, A., van Lieshout, M., 2010. Dizentanglingscale approaches in governance research: Comparing monocentric,multilevel, and adaptive governance. Ecology and Society, 15(4): 29.

Therkildsen, O., 2014. Legitimacy, local governments and natural resource management in Sub-Saharan Africa. *Occasional Paper*, (9), pp.75-92.

Thia-Eng C., 1993. Essential elements of integrated coastal zone management, Ocean & Coastal Management, Volume 21, Issues 1–3, 1993, Pages 81-108, ISSN 0964-5691, https://doi.org/10.1016/0964-5691(93)90021-P. (https://www.sciencedirect.com/science/article/pii/096456919390021P)

Torrel E., Bayer T.G., Daffa J., Amaral M., Hale L., Luhikula G., 2004. Building enabling conditions for integrated coastal management at the national scale in Tanzania. https://www.researchgate.net/publication/229353026_Building_enabling_conditions_for_integrated_coastal_management_at_the_national_scale_in_Tanzania

Tuyen, T.V., Armitage, D., & Marschke, M. (2010). Livelihoods and co-management in the Tam Giang lagoon, Vietnam. Ocean & Coastal Management, 53, 327-335.

Underdal, A., 2010. Complexity and challenges of long-term environmental governance. *Global Environmental Change*, *20*(3), pp.386-393.

Vandergeest, Peter and Chusak Wittayapak. 2010. Decentralization and politics. In The Politics of Decentralization: Natural Resource Management in Asia, ed. Chusak Wittayapak and Peter Vandergeest, 1–20. Chiang Mai: Mekong Press

Vannoni, M., 2015. What are case studies good for? Nesting comparative case study research into the lakatosian research program. *Cross-Cultural Research*, *49*(4), pp.331-357.

Vaske, J.J., Needham, M.D. and Cline Jr, R.C., 2007. Clarifying interpersonal and social values conflict among recreationists. *Journal of Leisure Research*, *39*(1), pp.182-195.

Walters, B.B., Rönnbäck, P., Kovacs, J.M., Crona, B., Hussain, S.A., Badola, R., Primavera, J.H., Barbier, E. and Dahdouh-Guebas, F., 2008. Ethnobiology, socio-economics and management of mangrove forests: A review. *Aquatic Botany*, *89*(2), pp.220-236.

Watala., 2009. 48% hutan ‘mangrove’ di Lampung rusak. Harian Lampung Post. Diakses melalui web pada pada 27 Maret 2013, pukul 20:35 WIB. http://watala.org/new/?p=156. 1 hlm.

Wibisono, I. T. C. & Suryadiputra, I. N., 2006. Study of lessons learned from mangrove/coastal ecosystem restoration efforts in Aceh since the tsunami. Bogor: Wetlands International Indonesia Program.

Wilson, S.M., Madel, M.J., Mattson, D.J., Graham, J.M., Burchfield, J.A. and Belsky, J.M., 2005. Natural landscape features, human-related attractants, and conflict hotspots: a spatial analysis of human–grizzly bear conflicts. *Ursus*, *16*(1), pp.117-129.

Wittmer, H., Rauschmayer, F. and Klauer, B., 2006. How to select instruments for the resolution of environmental conflicts?. *Land use policy*, *23*(1), pp.1-9.

Wood, A., 1993. Social conflict and change in the mining communities of north-west Derbyshire, c. 1600–1700. *International Review of Social History*, *38*(1), pp.31-58.

Wyborn, C. and Bixler, R.P., 2013. Collaboration and nested environmental governance: scale dependency, scale framing, and cross-scale interactions in collaborative conservation. *Journal of environmental management*, *123*, pp.58-67.

Yasmi, Y., Schanz, H. and Salim, A., 2006. Manifestation of conflict escalation in natural resource management. *environmental science & policy*, *9*(6), pp.538-546.

Yin, Robert K., Case Study Research: Design and Methods 1984: Sage Publications, Newbury Park, page 46.

Yin, R. K., 1984. Case Study Research Design and Methods. Newbury Park, CA Sage.

Yin, R. K. (2002). Case study research: Design and methods. Thousand Oaks, CA: Sage

Yin, Robert K., 2003. Case Study Research: Design and Methods. Thousand Oaks, Calif: Sage Publications, 2003.

Zorini, L.O., Contini, C., Jiddawi, N., Ochiewo, J., Shunula, J. and Cannicci, S., 2004. Participatory appraisal for potential community-based mangrove management in East Africa. *Wetlands ecology and management*, *12*(2), pp.87-102.