

Towards the Integration of Terrestrial and Marine Spatial Planning in Indonesia: A Case Study of Bali

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ABSTRACT

Indonesia is the largest archipelagic state in the world. It holds very important marine resources and some of the most biodiverse marine ecosystems. Marine spatial planning, a tool that can be used to control development and maintain ecosystem services, is vital to the future of the marine environment in Indonesia. Since 2007, the national government has required each province to create a Marine Spatial Plan (MSP). These are supposed to mesh with the already long-standing Terrestrial Spatial Plans (TSP). Together, these plans are meant to provide the underpinning for a range of government programs as well as permitting and licensing systems. The marine and terrestrial spatial plans must be synchronized to avoid conflicts and achieve the anticipated ecological and socio-economic objectives. In Bali, one of the provinces that is currently working on a new MSP and a revised TSP, the MSP appears to be driven almost entirely by the existing TSP. This could lead to future conflicts and a failure to achieve important environmental and social objectives because of lack of cross-realm consideration in the two plans.

In this thesis, I look at the current barriers to the integration of MSP and TSP in Bali and Indonesia. In my view, it is necessary for the government, in particular, the ministries that are responsible for spatial planning, to require both types of plans to be prepared at the same time. To do so, they need new procedures to ensure harmonization of land-sea considerations and improve local government capacities and commitment. In the long term, it may be necessary for the government to amend the existing legislation (Laws Number 26 and 27 Year 2007) to accommodate a more integrative approach to spatial planning of the land and the sea.

Thesis Supervisor: Lawrence Susskind

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List of Abbreviations and Acronyms

ATR-BPN	<i>Agraria dan Tata Ruang – Badan Pertanahan Nasional</i> – (Ministry of) Agrarian and Spatial Planning – National Land Agency
Bappeda	<i>Badan Perencanaan Pembangunan Daerah</i> – Regional Development Planning Agency
Bappenas	<i>Badan Perencanaan Pembangunan Nasional</i> – National Development Planning Agency
DKP	<i>Dinas Kelautan Perikanan</i> – Provincial Agency of Maritime Affairs and Fisheries
DPD	<i>Dewan Perwakilan Daerah</i> – Regional Representative Council (Senate)
DPR	<i>Dewan Perwakilan Rakyat</i> – People’s Representative Council (House)
DPRD	<i>Dewan Perwakilan Rakyat Daerah</i> – Regional People’s Representative Council (Regional legislative body)
GOI	Government of Indonesia
ICZM	Integrated coastal zone management
KKP	<i>Kementerian Kelautan dan Perikanan</i> – Ministry of Maritime Affairs and Fisheries
KLHK	<i>Kementerian Lingkungan Hidup dan Kehutanan</i> – Ministry of Environment and Forestry
Kemendagri	<i>Kementerian Dalam Negeri</i> – Ministry of Internal Affairs
MPA	Marine protected area
MPR	<i>Majelis Permusyawaratan Rakyat</i> – People’s Consultative Assembly (Congress)
MSP	Marine spatial planning
NGO	Non-governmental organization
PHDI	<i>Parisada Hindu Dharma Indonesia</i> – Indonesian Hinduism Society
PUPR	<i>Pekerjaan Umum dan Perencanaan Ruang</i> – (Department of) Public Works and Spatial Planning
RTRW	<i>Rencana Tata Ruang Wilayah</i> – Regional Spatial Plan
RZWP3K	<i>Rencana Zonasi Wilayah Pesisir dan Pulau-pulau Kecil</i> – Coastal and Small Islands Zoning Plan
SEA	Strategic environmental assessment
SPPN	<i>Sistem Perencanaan Pembangunan Nasional</i> – National Development Planning System
TKPRD	<i>Tim Koordinasi Penataan Ruang Daerah</i> – Regional Spatial Planning Coordinating Team
TSP	Terrestrial spatial planning

Chapter I.

Introduction

The ocean is very important for the world's population. Everyone relies on the ecosystem services the ocean provides, whether directly or indirectly. However, there are unanswered questions about the best way to utilize and manage these precious resources, from the global to the local scale. One approach to managing ocean utilization, especially at regional-local scale, is Marine Spatial Planning (MSP). MSP is a relatively new method to manage marine resource utilization by allocating human activities within a certain space and time according to desired socio-ecological objectives. Due to land-sea interactions, MSP needs to be integrated with Terrestrial Spatial Planning (TSP), a long-standing planning regime that is MSP's counterpart on land. In this thesis, I discuss the relationship between these two types of planning in Indonesia, focusing on a case study of the Province of Bali.

This chapter begins with an introduction to the history of MSP and TSP, both in theory and in practice, and discusses why they need to be planned in a more integrative manner. That will be followed by a brief introduction to Indonesia, its maritime history, and the development of its MSP and TSP policies. Finally, the chapter will close with a summary of the research questions I have set out to answer along with a preview of the rest of the thesis.

1.1 Terrestrial and Marine Spatial Planning

More than 70% of the earth's surface is covered by the ocean (Lutgens and Tarbuck 2012). The marine ecosystems, composed of the physical environment and living resources within it, provide countless services that humanity relies on. These range from direct services (e.g., fisheries and tourism) to indirect services (such as carbon sequestration) (Böhnke-Henrichs et al. 2013;

Hattam et al. 2015). Some of the most valuable ecosystem services on earth (quantified in \$ value/area unit) are located within the sea (de Groot et al. 2012; Costanza et al. 2014). Our very existence depends on the sea.

Unfortunately, the condition of this ecosystem is declining from various threats and stressors, such as pollution, overfishing, and global climate change, among others (Arico et al. 2005). Most of the stressors are caused by human activity, directly or indirectly. A global map of human impact on the marine ecosystem shows that greater impacts occur in coastal regions with larger populations (Costanza et al. 1997; Halpern et al. 2008). A significant portion of the world population lives close to the sea. Global coastal population, often defined as the population within 100 km from the coastline, is estimated to be close to 40% or about 2.7 billion people (Cohen et al. 1997; Matti et al. 2016). This number is expected to increase in the foreseeable future, from both population growth and coastal migration (Hugo 2011; Neumann et al. 2015). This will further increase our demand on marine ecosystem services, which in turn will heighten the competition for resources and cause increasing conflict in coastal regions. To mitigate this problem, planning and resource management are required.

Historically, the management of coastal seas (and lands) is mostly the responsibility of coastal state governments. They tend to work in a sectoral fashion to achieve specific sectoral objectives (such as the maximum sustainable yield of tuna for the fishing industry) according to the interests of particular stakeholders (Crowder et al. 2006). More recently, the focus of coastal management has been primarily on ecosystem-based management (EBM) principles that take a very broad view (rather than a sectoral view) of the ecosystem. Management along these lines involves societal choices in the context of substantial complexity, given the interconnections among various socio-ecological systems (Long, Charles, and Stephenson 2015). Integrated coastal

zone management (ICZM) was developed as a tool to manage coastal resources in the face of this complexity (Forst 2009). However, ICZM is not specifically focused on addressing the management of the sea zone beyond the defined coastal sea space. The emergence of marine spatial planning (MSP), and specifically ocean zoning, has provided an explicit spatial management tool to complement the existing terrestrial spatial planning (TSP) to achieve the desired objectives in marine spaces (Ehler and Douvère 2009; Agardy 2010).

To elucidate the ideas of TSP and MSP, the following subsections will introduce the brief historical context, development, and current approaches to TSP and MSP, as well as clarifying the terminologies and concepts that will be the subject of this thesis.

1.1.1 Terrestrial Spatial Planning (TSP)

Modern spatial planning and zoning in the terrestrial realm have been around for many decades. According to Hall (2002), it originated in the latter part of the 19th and early 20th century as a reaction to the development of Western industrial cities (Fainstein and DeFilippis 2015). The desire of visionaries to create the ideal city with adequate sanitation, efficient infrastructure, and an orderly mode of living drove the initial development of urban planning. The initial purpose of such planning was aesthetic and utopian (McLoughlin 1969). Over time, planning shifted toward a more rationalist-scientific approach (Flyvbjerg 1998). This version of planning was then challenged by a communicative-participatory approach (Huxley and Yiftachel 2000) that has now grown into a more integrative approach going beyond land-use planning, and embracing a broader picture of environmentalism, socio-economic development, and social justice (Tewdwr-Jones, Gallent, and Morphet 2010; Huxley and Yiftachel 2000). Table 1 below summarizes the historical development of these various planning paradigms.

<i>Early 20th Century</i>	<i>Mid-20th Century</i>	<i>Late 20th Century</i>	<i>Early 21st Century</i>
Planning as a design process	Planning as a scientific process	Planning as a communicative process	Spatial planning: integrative, holistic
<i>Changing Planning Paradigms</i> →			

Table 1. Dominant views on the 'ideal' planning process. (Kidd and Ellis 2012)

Plans are usually intended to achieve specific objectives. They are the product of a planning process and presented as spatially coded information (both in textual and cartographic forms). They can be presented at various scales and detail as shown in Figure 1 below (Hersperger et al. 2018). Typically, the goal is to regulate the development of public and private land. Plans and planning processes are typically mandated by national or state legislation. In the USA, planning involves the exercise of the ‘police power’ by the local government which places land into zones or use categories, for the benefit of the public welfare (Alterman 2013).

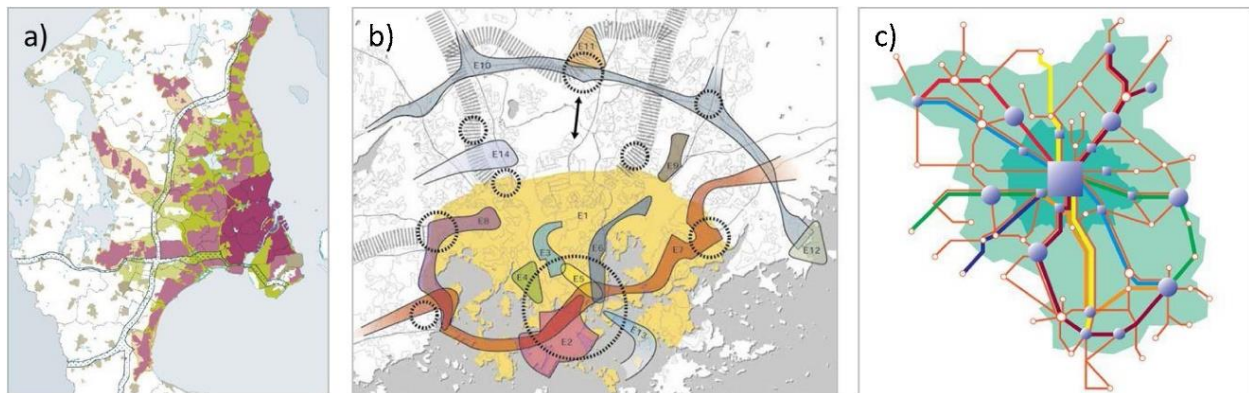


Figure 1. Graphical illustration of planning intentions as geographically accurate maps with (a) clear and (b) fuzzy borders, or as (c) diagrammatic representation. (Hersperger et al. 2018)

The use of planning terminology varies according to place, planning zone, and scale of planning (urban planning, regional planning, town planning, land-use planning, etc.) There is no agreed-upon definition of TSP or associated planning efforts (not to mention how interchangeably the terms are used) (H. D. Smith et al. 2011a). However, one common focus of all planning regimes

is terrestrial (as opposed to ocean or water) jurisdiction. The term “TSP” will be used throughout this thesis to represent a focus on land to distinguish it from its marine counterpart.

1.1.2 Marine Spatial Planning (MSP)

Similar to TSP, there is no “definitive” definition of MSP. However, UNESCO’s guideline on MSP, the most referenced definition, defines MSP as a

“public process of analyzing and allocating spatial distribution of human activities to achieve objectives that has been specified through political process.” (Ehler and Douvere 2009)

Unlike its terrestrial counterpart, marine spatial planning (MSP) is a relatively new planning idea. According to Kerr and Side (2014), the development of MSP was largely in response to three concerns:

(i) historic failure to protect the marine environment and its living resources; (ii) increased competition for marine space; (iii) and opportunities for new economic growth based on marine resources.

Sea use planning was formally proposed in the 1970s as a way to manage the ocean commons more carefully because of the heightened use of the marine space in the United Kingdom (Young and Fricke 1975). At around the same time, the creation of the 1975 Great Barrier Reef Marine Park Act in Australia is considered as the first MSP created through regulation requiring zoning not dissimilar to TSP (Kenchington and Day 2011).

The development of MSP was also made possible through the development of an international legal framework and the technology to support it. In the past, there was no clear boundary for sea space under coastal state jurisdiction. It was the custom then to respect the sea zone of coastal states three miles out from the coastline (the cannon rule). However, the 1982 UN Convention on the Law of the Sea (UNCLOS) gave coastal states internationally recognized jurisdiction over the space and resources within their maritime zone (refer to Figure 2 below) (Maes 2008). The next development that was crucial for MSP is the technological advancement of

satellite-based information systems, especially GPS, digital mapping tools, and geographic information system (GIS) (Kerr, Johnson, and Side 2014). These enabled a more precise method of defining spatial boundaries on the surface of the sea. Development of decision support tools (and greater computing power) have made it easier to operationalize MSP (Sutrisno, Gill, and Suseno 2018).

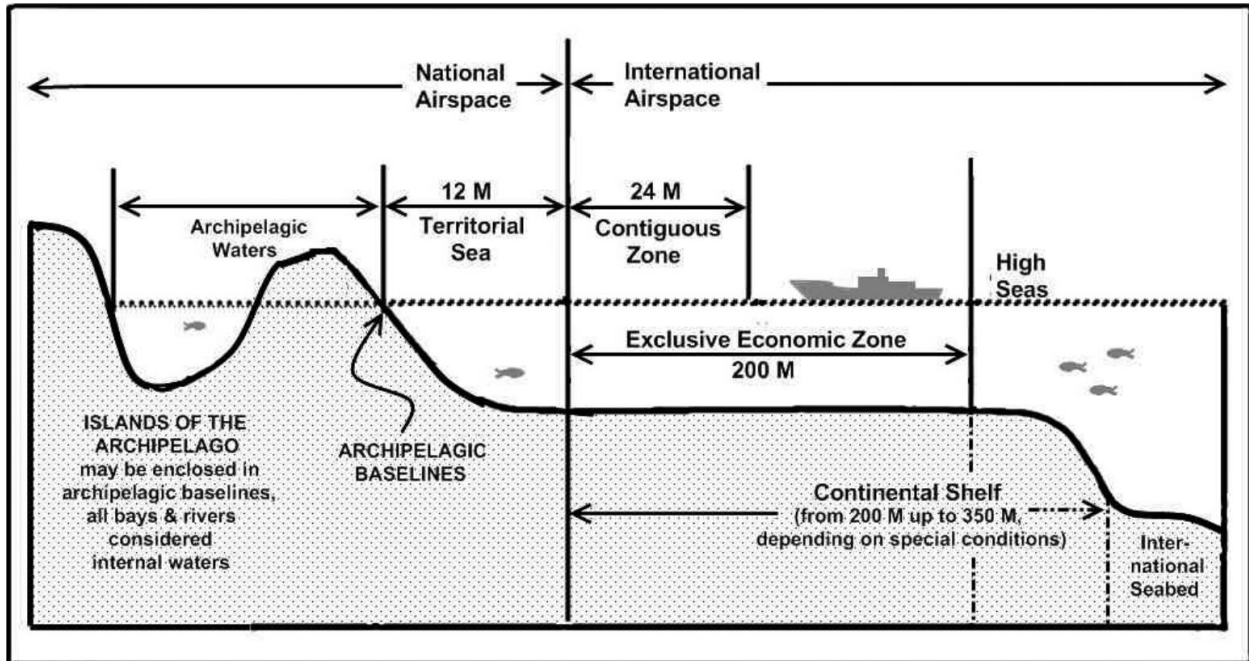


Figure 2. Maritime zones under the UNCLOS (Baviera and Batongbacal 2013)

One of the distinct differences between MSP and TSP is the common property regime that distinguishes marine space from its terrestrial counterpart (Forst 2009). Since it governs the use of common space, coastal state governments are responsible for the development of MSP (Ehler and Douvere 2009). Similar to TSP, MSP is envisioned as a source of guidelines for licensing and a tool for development control (Douvere 2008). There is no consensus on how detailed and strict the plan of MSP should be (similar to TSP in Figure 1). Indeed, the UNESCO guideline does not call for a zoning scheme; MSP can take the form of more abstract, fuzzy, and negotiable guidelines

(Douvere et al. 2007). However, Agardy (2010) strongly advocates for ocean zoning as the most effective spatial management tool that should be integral to MSP.

1.1.3 The Need for Integration

MSP is a relatively recent innovation that has spread around the world but has not yet caught up to TSP. The two planning regimes are significantly different from one another in several ways (Jay 2010; Kerr, Johnson, and Side 2014). First, the biophysical natures of marine and terrestrial environments are different. Second, human activities in both spaces (that result from the contrasting biophysical features) are inherently different, which in turn differentiates the social, institutional, and legal requirements of TSP and MSP. Despite their differences, they share certain features, and the interrelationship between the two is extremely important (Kidd and Ellis 2012).

Both MSP and TSP seek to regulate human activity, and they share a spatial boundary at the coastline (Kay and Adler 2005; Kidd and Ellis 2012). This shared ‘boundary’ within the ‘liminal space’ of the coastal zone (Leyshon 2018) is where various biophysical processes happen across the land-sea line (Stoms et al. 2005). Alvarez-Romero et al. (2011) classified land-sea interactions in three main categories: ecological processes (biophysical), cross-system threats (which happen both ways, but more asymmetric due to the larger influence of land on the sea), and socioeconomic interaction. Figure 3 below illustrates the tropical coastal land-sea interaction. Although coastal land and sea are closely linked, these interactions are often not considered. This increases the risk that planning objectives will not be achieved (Stoms et al. 2005).

MSP is touted as one of the tools that can be used to advance the targets of Sustainable Development Goals (SDG), especially for Goal 14: Life Below Water. With the aforementioned interrelationship between the two realms, spatial planning in the land and sea reveals a more interconnected impact on SDGs, such as with Goal 6: Clean Water and Sanitation, as well as Goal

15: Life on Land. Thus, there is a strong argument to pursue a more holistic approach to spatial planning if we would like to tackle the sustainability issue, especially at the coastal region.

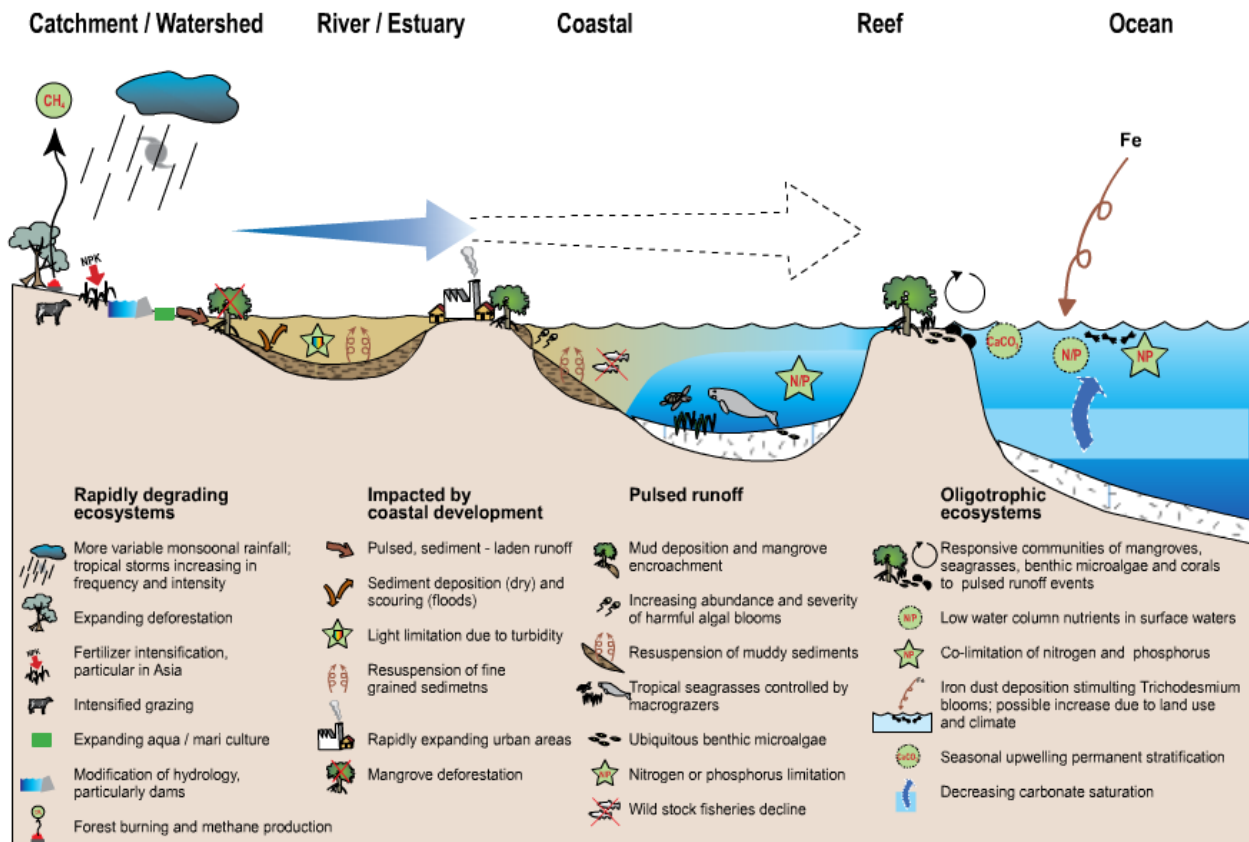


Figure 3. Illustration of Land-Sea Interaction in tropical coastal habitat (Integration and Application Network, n.d.)

Since the early development of MSP, integration with TSP has been promoted, even though there is no consensus on the optimal method and implementation to achieve it (H. D. Smith et al. 2011a). C-SCOPE, an initiative under the European Union’s MSP directive, seeks to develop an integrated framework for planning MSP and TSP. However, there was no definite conclusion on how to best integrate MSP and TSP (N. Smith et al. 2012). One of the most integrated approaches to TSP and MSP exists in Germany, where the state (*länder*) chancellor’s spatial planning department holds the authority for both MSP and TSP development (MSP IOC UNESCO, n.d.).

Both in practice and the academic world, there is no agreement on how TSP and MSP should or could be integrated. Indeed, it may be impossible to fully integrate the two planning regimes because of the differences between them (Kerr, Johnson, and Side 2014). The technical and institutional gaps between the two realms have been considered to be difficult to bridge. However, there is almost a consensus that greater coordination between the two and systematic consideration of land-sea interactions in planning are very important and should be pursued (Kerr, Johnson, and Side 2014; Álvarez-Romero et al. 2011; Stoms et al. 2005).

1.2 Terrestrial and Marine Spatial Planning in Indonesia

Indonesia is the largest archipelagic state in the world. It holds some of the most important and biodiverse marine ecosystems. Because of this, sea space and the resources in the country are very important economically, socially, and culturally. This section will introduce the maritime features of the Indonesian archipelago, its history, and the emergence of spatial planning regimes for protecting the terrestrial and marine environment.

1.2.1 Indonesia, its Sea, and People

Indonesia is a sovereign archipelagic state in Southeast Asia. It is located at the intersection of two oceans – the Pacific Ocean and the Indian Ocean – and two continents – Asia and Australia. Indonesia shares terrestrial borders with Malaysia, Papua New Guinea, and East Timor. The country also shares maritime boundaries with Singapore, Malaysia, Thailand, Vietnam, Philippines, Palau, India, and Australia (Figure 4). As an archipelagic state, Indonesia has jurisdiction over 16,056 named, reported, and verified islands (BPS-Statistics Indonesia 2018). The capital of the country is Jakarta, located on the island of Java. The total land area of the country is more than 1.9 million sq.km and the maritime area, including the Exclusive Economic Zone (EEZ) specified by the Law of the Sea, is around 6 million sq.km. (2018; Ferrol-Schulte et al.

2015) The coastline length is estimated to be about 81,000 km, second largest after Canada. It has the most biodiverse marine environment in the world, containing about 18% of the world's reefs (Dahuri 2003) along with other important natural resources such as minerals, oil, and gas.

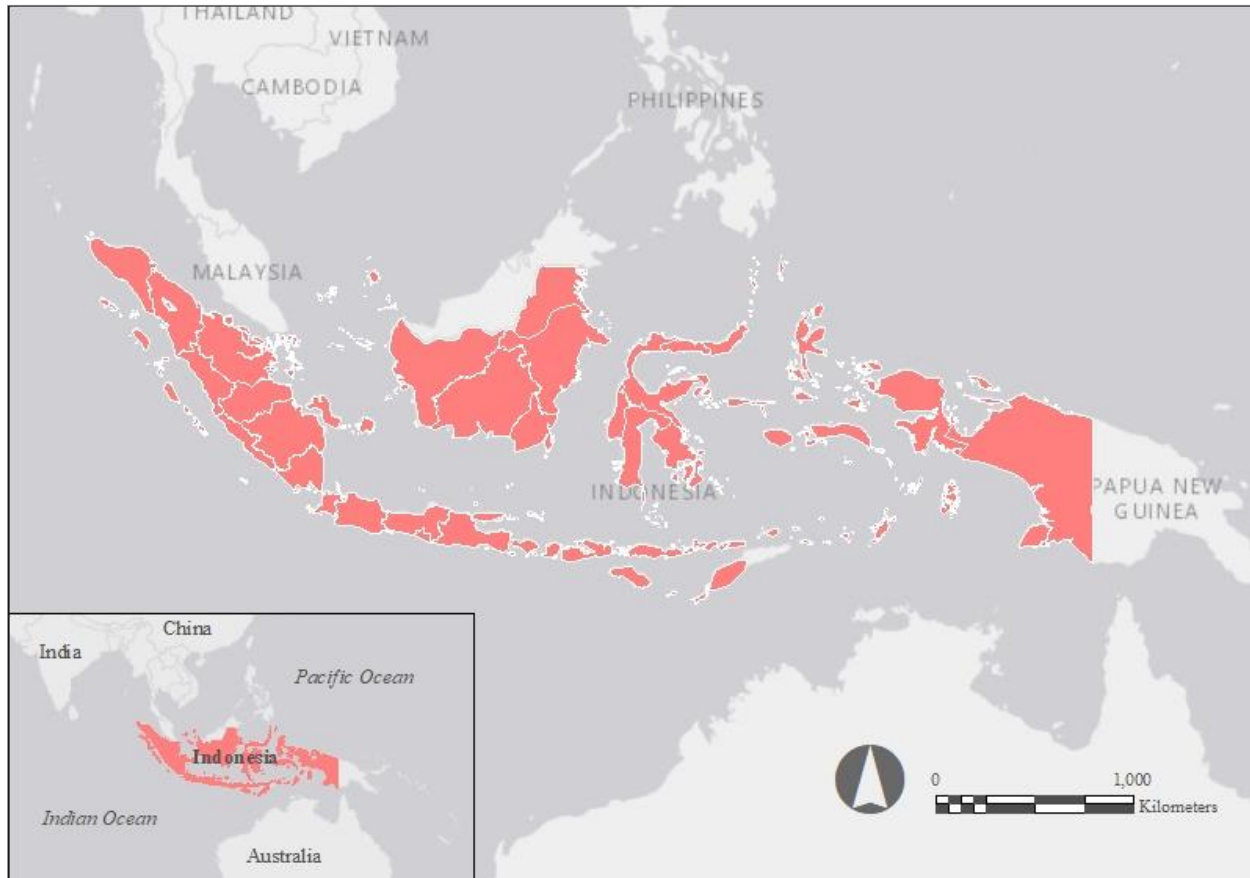


Figure 4. Map of Indonesia (Sources: Esri, DeLorme, HERE, MapmyIndia)

As the world's 4th largest, the current estimation of Indonesia's population is around 260 million people. This number is expected to grow to around 300 million by 2035 (Bappenas, BPS, and UNPF 2013). An estimated 220 million people live within 100 km distance from the coast. It is also the country with the largest Muslim population in the world (~90% of the population). Its official national language is Indonesian with hundreds of local languages spoken throughout the archipelago. Most of the population (almost 80%) live on the islands of Java and Sumatra (UNDP et al. 2000; Zikra, Suntoyo, and Lukijanto 2015).

Indonesia is a republic with a democratically elected president as a chief executive who appoints a ministerial cabinet. The legislative body is the People’s Consultative Assembly or MPR. It is composed of the DPR (House) and DPD (Senate) which are made up of elected members. After the end of the authoritarian New Order regime in 1998, much of the national authority’s power was decentralized to regional governments. The amended constitution and national laws that regulate their roles and hierarchy (Table 2) specify this. Currently, Indonesia is divided into 34 provinces that are also called “Level 1” regional governments and are headed by elected governors, with Regional Representative Council (DPRD) as a regional legislative body. All provinces of Indonesia have sea space. Below the province level, there are *kotamadya* (cities) and *kabupaten* (regencies) as “Level 2” regional government that are governed by elected mayors or regents. The regional government is authorized to create agencies under its jurisdiction that mirror the national government according to their characteristics and needs, following the national regulation. Below those, there are sub-districts (Level 3) which are areas headed by civil servants that are appointed by the regent/mayor, that are further divided into villages (Level 4) that can be governed by an elected or appointed head (Figure 5).

Regulations	
1 Undang-Undang Dasar RI 1945 (UUD '45)	Constitution of Indonesia
2 Ketetapan Majelis Permusyawaratan Rakyat (Tap MPR)	People’s Consultative Assembly Stipulation
3 Undang-Undang (UU)	Law (or Act)
4 Peraturan Pemerintah Pengganti Undang-Undang (Perppu)	Government Regulation In lieu of Law
5 Peraturan Pemerintah (PP)	Government Regulation
6 Peraturan Presiden (Perpres)	Presidential Regulation
7 Peraturan Menteri (Permen)	Ministerial Regulation
8 Peraturan Daerah (Perda)	Regional Regulation

Table 2. Types of regulation in hierarchical order

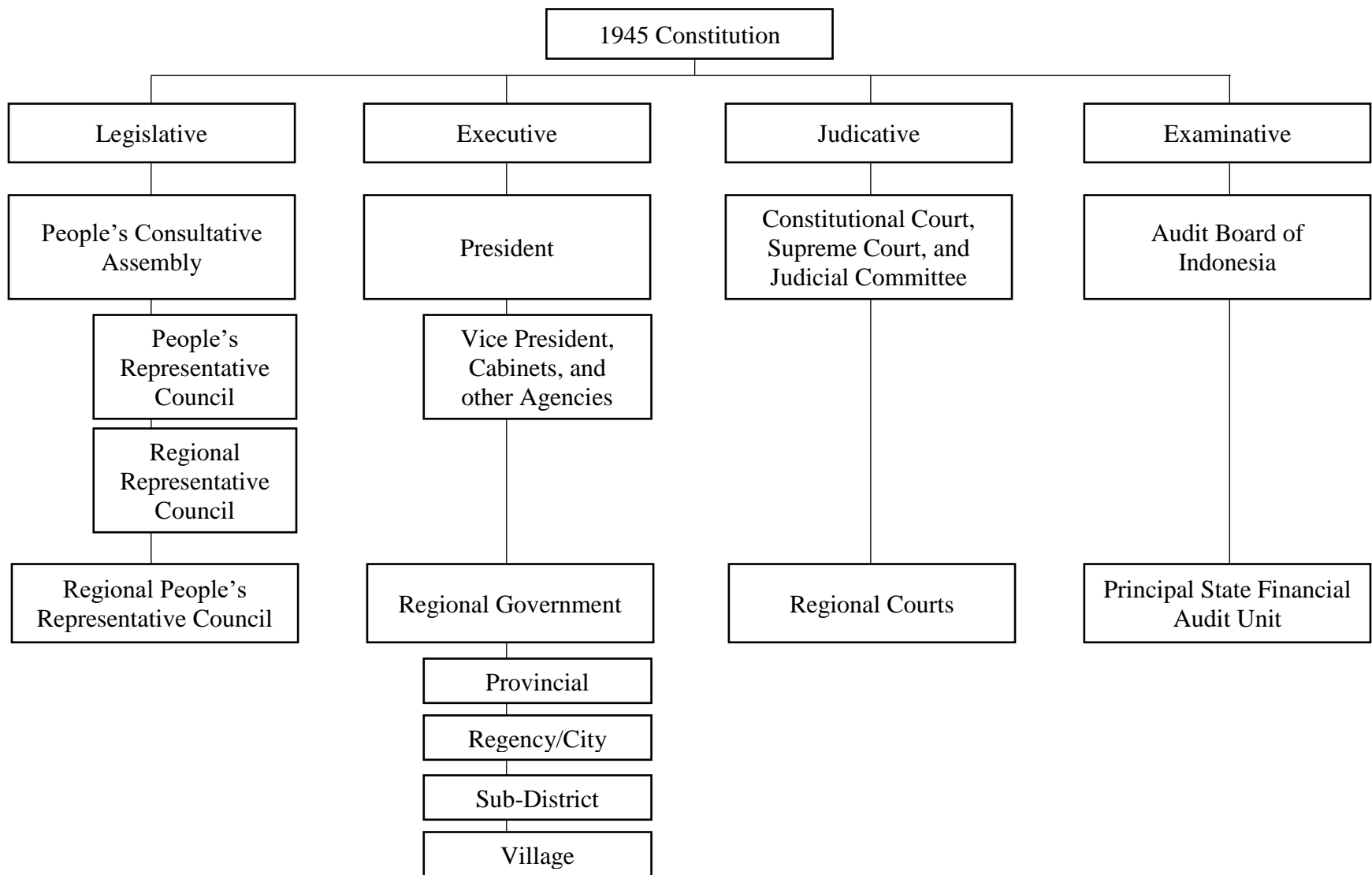


Figure 5. Indonesia's political system

1.2.2 Indonesia Maritime History

The pre-colonial history of Indonesia was dominated by the presence of two maritime kingdoms: Srivijaya (7-14th century) and Majapahit (late 13-16th century). At their peak, both empires reigned over the territory that covers most of present-day Indonesia and beyond. Both empires thrived from trade, control of the Malacca Strait, and the South China Sea trading route. They were known for their archipelagic seamanship, which helped them extend their influence to China and India. At the end of the Majapahit reign, the more agrarian Islamic kingdom of Mataram rose and curbed the expansion of coastal growth and wealth. This maritime outlook culminated at the end of the Indonesian kingdoms and the beginning of a colonial era (Taylor 2003; Diposaptono 2015).

By the 18th century, the Dutch were the most prominent colonial power in the region, with English and Portuguese controlling several strategic locations (Malacca, Singapore). The Dutch colonial control of the Indonesian archipelago (then known as Dutch East Indies), as well as the ports for trade and shipping, had changed the outlook and livelihood of the native population more toward the land for production of agricultural commodities for the European market (Mulya 2014). This further alienated the people from the sea. The strategic importance of the Dutch East Indies in World War II's Pacific theatre had brought the subsequent Japanese occupation of Indonesia, which subjected the native population to a similar plight as under Dutch colonial rule, as Japan sought war resources (Diposaptono 2015).

After the people's struggle that brought independence in 1945, the new government of Indonesia struggled with various internal and external matters, which gave maritime considerations a much lower priority. Around this time, the international sea regime was still the *mare liberum* or freedom of the sea. By the 1960s, the international community only acknowledged

Indonesia's maritime jurisdiction up to 3 miles from the coast. During the United Nations Conference on the Law of the Sea (UNCLOS I-III), Indonesia made a declaration (Djuanda Declaration) which became what is recognized as the archipelagic sea regime, a distinct jurisdiction for archipelagic states. The government of Indonesia (GOI) claimed this spatial regime to promote its national maritime identity. This provision became the basis of Indonesia's contemporary marine jurisdiction (Diposaptono 2015).

Despite the efforts made by the government to claim its archipelagic rights on the international stage, for the next three decades, the sea did not get much attention from national policymakers. Other than fisheries, there was no serious regulation, or national program created to manage various aspect of the ocean environment. There were several projects initiated by international aid agencies that tried to create MPA or ICZM programs in selected locations in Indonesia in an ad-hoc manner (Crawford et al. 1995). Certain local communities have laws (and traditions) of their own regarding coastal resource management that were not acknowledged until recently (Purwaka and Sunoto 1999). At the national level, there was no ministry or department that deals with maritime affairs in particular until the end of Suharto's authoritarian New Order regime (widely known as the "reformation") that lasted from 1966 to 1998.

This changed when Indonesia's Sea Exploration Ministry was created in 1999. Its nomenclature changed several times until what is now known as the Ministry of Maritime Affairs and Fisheries (KKP) was named. The ministry is tasked with various challenging matters, such as IUU (illegal, unreported, and unregulated) fishing. This involves interactions with neighboring countries. Locally, there are various environmental problems and management issues such as pollution, sea level rise, ecosystem degradation, overfishing, poverty in the coastal area, all of which require the attention of not only KKP but also other ministries. It is imperative that good

coastal and ocean management be put in place to address these issues. These are all part of why a spatial based management policy is required as one measure to manage its coastal and ocean use.

1.2.3 TSP and MSP in Indonesia

During the period of Dutch colonial rule, spatial planning for agriculture management (allocation of cash crops) and town planning was institutionalized. After independence, the GOI codified the seminal Basic Agrarian Law (No. 5 Year 1960) that regulates real property and become the basis of spatial planning. However, it was not until 1992 that a law was passed to regulate spatial planning that focused on urban development and imposed by the central government (Law No. 24 Year 1992) (Roosmalen 2004).

In 2004, the GOI created the National Development Planning System, or SPPN (Law No. 25 Year 2004), that outlines the policies, programs, and directions that the state will pursue. This requires the development of long term (15-20 years), medium (5 years), and short (1 year) term development plans for national and regional administration. Three years later, in 2007, GOI revised the old spatial planning law and added two new laws (Law No. 26 and 27 Year 2007) that require all national and regional governments (Level 1 and 2) to develop TSP and MSP respectively. However, the MSP was revised in 2014 when two new laws were added (Law No. 1 and 23 Year 2014). These replaced the marine licensing system and transferred the right of Level 2 regional government to manage marine resources to the provincial government. This eliminated the requirement to develop the MSP at the lower regional level (Refer to Figure 6 below).

The TSP is called Regional Spatial Plan, or RTRW, which is divided into three hierarchical levels and scale: National, Provincial, and City/Regency. This plan will be valid for 20 years, which need to be reviewed for every five years and revised if necessary. The lower level government plans need to be developed with reference to the higher-level spatial plan as well as

in accordance with the development plan of the appropriate level. For example, a provincial TSP will need to be developed following the national TSP as well as the long-term national and provincial development plan. At the city/regency level, the Regional Spatial Plan will be further developed into the Detailed Regional Spatial Plan, or RDTR, which is the basis for permitting and licensing system on land. This plan will be valid for five years. It has to be developed following the regency/city spatial plan and medium-term development plan.

The national institution in charge of regulating these planning regimes is the Agrarian and Spatial Planning – National Land Agency Ministry (ATR-BPN), which also develop the national spatial plan. For the regional government, the governor/regent/mayor devolves the authority to develop the plans to the regional agency with the appropriate capability/authority (usually a public works or spatial planning agency). Other than these plans, there are special plans that are called Strategic Area Regional Spatial Plan at the national and provincial level that organize spatial distribution of specially designated area (Law No. 26 Year 2007) which is developed by national ministry.

On the other hand, MSP is structured differently. At the national level, the GOI, under the authority of Ministry of Maritime Affairs and Fisheries (KKP) plans for National Marine Spatial Plan, or RTRLN, which is still under development. At the regional level, MSP is called Coastal and Small Islands Plan or RZWP3K, which is only exists in provincial level due to the change in laws that removes the authority of coastal regency/city to sea management (Law No. 23 Year 2014). The sea jurisdiction of the province is given according to the national law, which is 12 nautical miles seaward from the coastline or the median line between two or more adjacent or neighboring provinces, and international boundary. Beyond the marine space, the MSP jurisdiction

may include small islands that has less than 2000 sq. km. area. The provincial agency in charge of maritime affairs and fisheries (DKP) is authorized to develop regional MSP.

The MSP is composed of spatial and non-spatial components. It is divided into four separate-but-hierarchically-related plans. First, there is the closely related Coastal and Small Islands Strategic Plan and Coastal and Small Islands Zoning Plan (RZWP3K). These plans outline the broad policy and spatial allocation sea utilization that would be applicable for 20 years, with five years review period, similar to the Regional Spatial Plan. The zoning plan will be the basis for permitting system for marine space use. Next, there is the Coastal and Small Islands Management Plan, which outlines management program that can be developed comprehensively (for the whole province) or partially according to needs. This plan is valid for five years. Finally, the MSP includes a yearly Coastal and Small Islands Management Action Plan that provides target, budget, and schedule to achieve planning objectives. The plans need to be developed according to the plan above it as well as the provincial Regional Spatial Plan and development plan (Law No. 27 Year 2007). Refer to Figure 6 below for reference. Similar to TSP, there are also special plans that are called Strategic Area Zoning Spatial Plan at the national level that organize the spatial distribution of strategically important area that is determined by legislation.

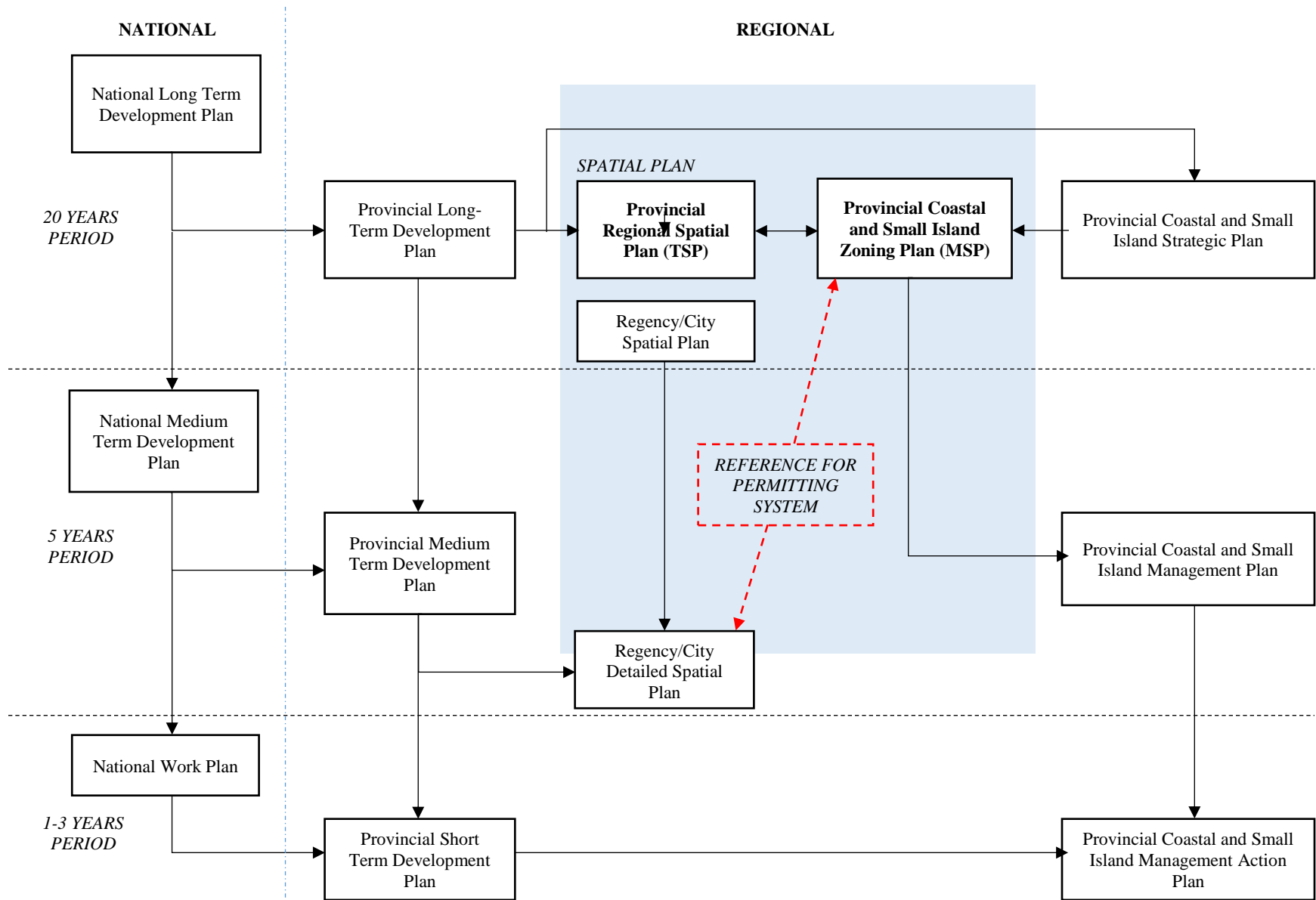


Figure 6. Regional spatial plans within the National Development Planning System

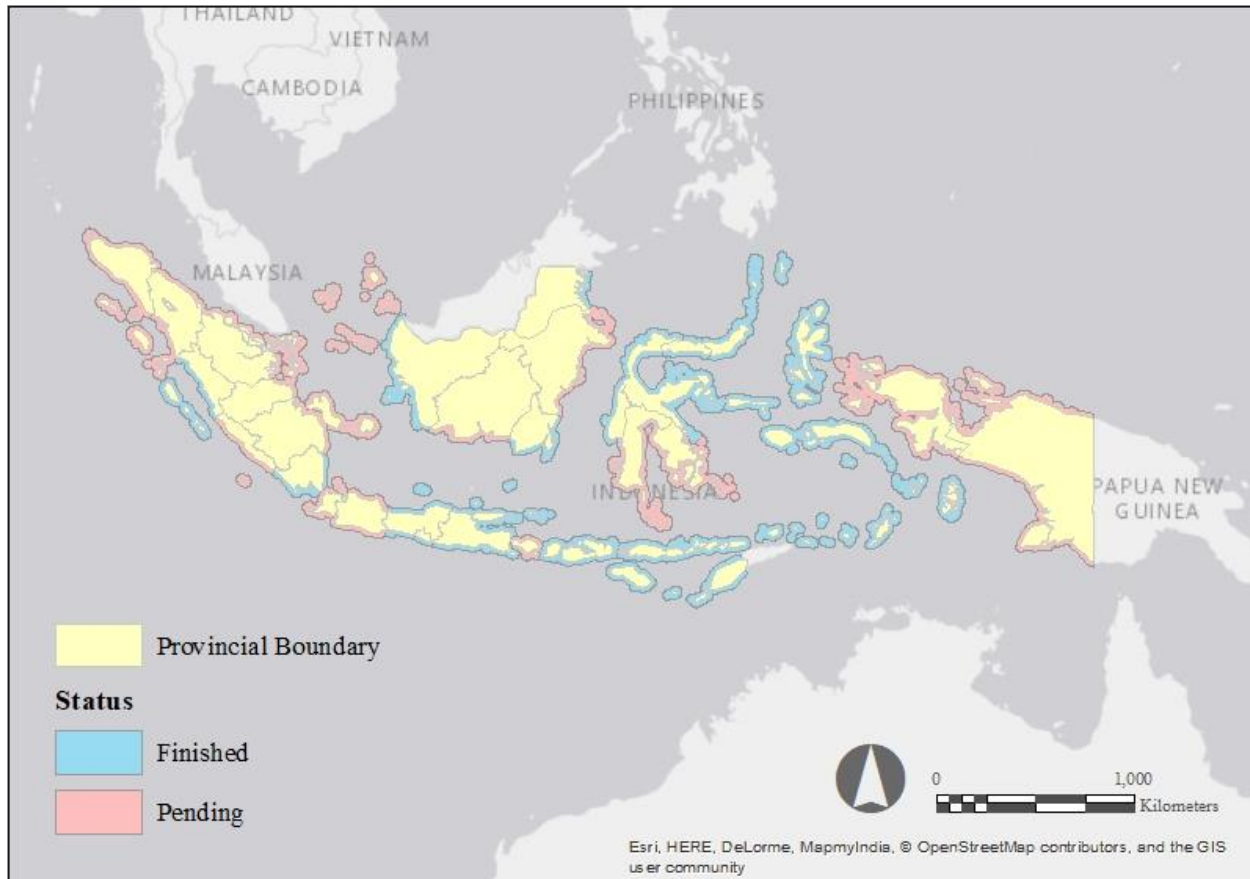


Figure 7. Status of MSP – TSP development in 34 provinces

1.3 Research Question and Summary

In summary, MSP is an important instrument for development control in Indonesia because of the country's dependence on the marine environment. The completion of MSPs is also very important to provide clearance for standby investment/development projects. However, it is also critical that the plans take TSP into consideration (and vice versa) because of the importance of land-sea interaction. Lack of integration, or coordination, and careful consideration of land-sea interaction could cause undesired effects and conflicts in the future. It is important for practitioner and academician to understand the relationship and institutional settings of the two types of planning and determine whether the current system is sufficiently integrated or whether closer integration is desirable at this time. Thus, the broad research questions for this thesis are:

- How the regulations of spatial planning in Indonesia define the integration of MSP and TSP?
- How is it being practiced in the case study of Bali?
- What are the barriers to greater integration/coordination?
- How can these barriers be overcome?

I will try to address gaps in the available research of integrated land-sea spatial planning, which is often called for (without clear methods for doing so), by analyzing the socio-ecological context of planning in Bali, and proposing what might work, technically and institutionally, in the Indonesian context.

The next chapter will introduce Bali as a case study and review the research data and methodologies. Chapter 3 will discuss the current understandings about integrated land-sea planning to determine how the two planning regimes can be better integrated or coordinated. It will also compare several countries and their approach to coordinate MSP and TSP. Chapter 4 will analyze the policy and institutional context for MSP and TSP in Indonesia, using the SES framework and evaluate its integration. Finally, the last chapter will be concluded with the summary of the research's findings and recommendations for spatial planning and future research.

Chapter II.

Case Study and Methodology

The research for this thesis is based on a qualitative case study approach. I have, as such a method would imply, examined real-life situations, developed theory, evaluated programs, and considered suitable recommendations (Yin 2009; Stjelja 2013; Gustafsson 2017). My qualitative research combines both deductive and inductive methods, allowing me to employ an appropriate analytical framework (Pittman and Armitage 2016). Before I summarize my findings, I will offer a theory of integration, drawing on a systematic review of the relevant literature (Randolph 2009; Petticrew and Roberts 2006). My analysis of the MSP and TSP in Indonesia builds on a social-ecological system (SES) framework while I systematically compare and discover the relationships between the two planning regimes in both theory and practice.

This chapter will introduce my case study as well as the methods that I used to gather and analyze the data. First, I will give a brief overview of the Province of Bali and the reasons for choosing it as a case study site. Then, I will outline the land-sea planning literature research method that I have conducted. Subsequently, I will explain the method of analysis, including the data that I have gathered. Finally, I also highlight the limitations on both the data that I was able to collect and the methods that I have chosen to use.

2.1 Case Study: Bali

Bali is arguably the most well-known tourist destination in Indonesia for both domestic and international visitors. In the past few decades, Bali has experienced massive economic and physical development because of the tourism industry expansion. This development brought benefits but also various problems such as environmental and social impacts. The MSP and TSP

in Bali are intended to control the adverse effects of coastal development. However, despite this importance, the MSP has not been developed very well. Out of 34 provinces, Bali is in the bottom six (together with East Kalimantan, Riau, Bangka Belitung, Papua, and South Sumatra) with regards to the progress of MSP development, as of January 2019 (Direktorat Perencanaan Ruang Laut 2019). Since Bali is developing its MSP together with a revision of its TSP, it provides an excellent opportunity to examine the state of national spatial planning and policy in Indonesia.

2.1.1 Bali at a Glance

Bali is the name given to the group of islands and the largest island that fall under the administrative jurisdiction of the Province of Bali. It is located in the southern part of Indonesia, between the island of Java and West Nusa Tenggara. The total land area under its jurisdiction is approximately 5,637 km² while the ocean space is about 9,289 km². The coastline length is around 633 km (BPS Provinsi Bali 2018b).

The population of Bali was approximately 4.25 million in 2017 (2018b). The native population speaks local Balinese as well as Indonesian as the official language. The religion of the majority of the population is Hindu (83.5%), followed by Islam (13.4%), and other minorities (BPS 2010). The local culture that was developed from the Hindu religion and Balinese customs are distinct from the other provinces in Indonesia. This manifests in the distinct architecture, traditions, art, and way of life in Bali. This unique culture, combined with the natural landscape of the province have become the basis of tourism in Bali. Tourism generated more than 67% of the province's GDP (compare to Indonesia's GDP from tourism at 5%) and have contributed more than 1.8 million of job in 2018 (DeLacy, Lipman, and Law 2014; Law et al. 2016; Kementerian Pariwisata Indonesia 2018). In 2017, the number of domestic tourists visiting Bali was estimated

to be more than 8.7 million. On the other hand, the international visitors almost reached 5.7 million, roughly 40% of total foreign visitors to Indonesia in 2017 (BPS Provinsi Bali 2018a).

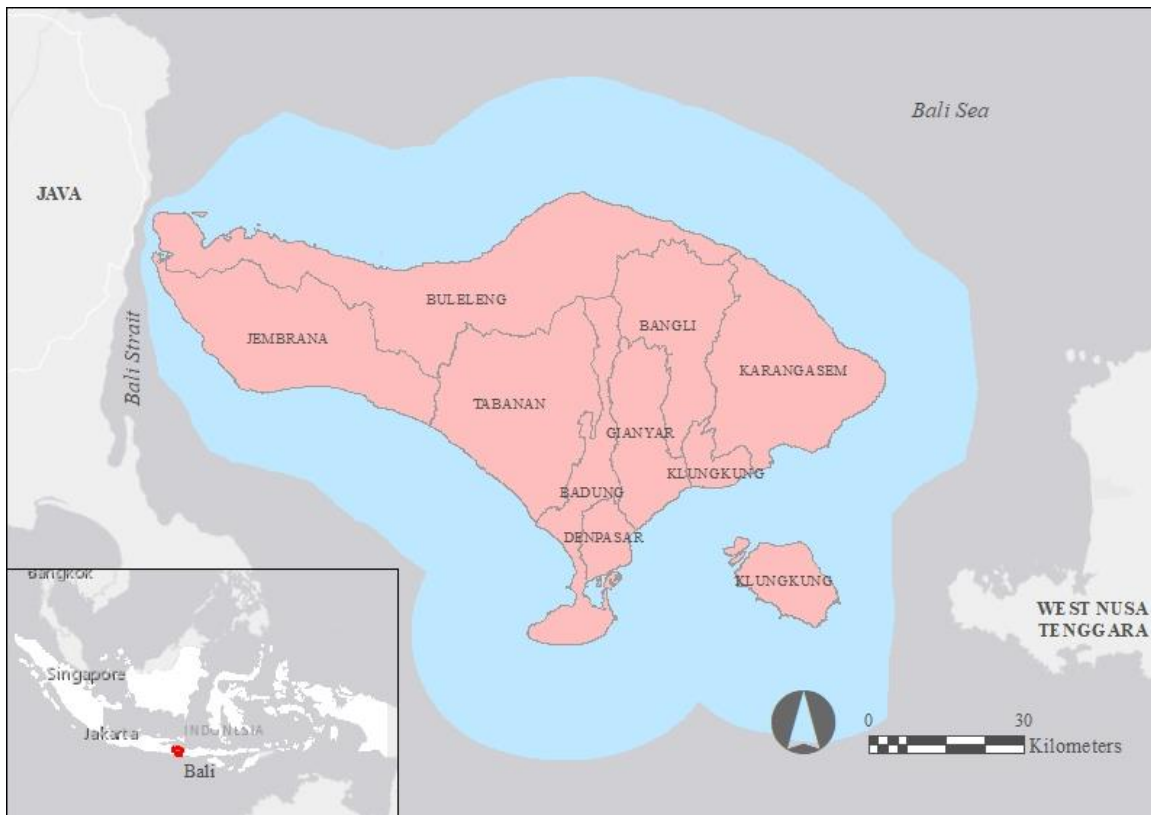


Figure 8. Map of the Province of Bali and its regencies/city boundaries (Sources: Esri, DeLorme, HERE, MapmyIndia)

The regional governance system is structured following national laws and regulations. The province (Level 1) administration is subdivided into eight regencies and one city (Level 2), see Figure 8 for reference. Out of all Level 2 administrative government in Bali, only one regency does not possess any sea space under its jurisdiction. These eight regencies and one city are further subdivided into 57 districts (Level 3 Area), which in turn are broken down into 636 villages (Level 4 Area). Other than the formal government structures, the traditional governance at the customary village (*desa pakraman*) level and the laws (*awig-awig*) they create are still widely influential and respected. At the broader provincial level, the Hindu religious authority (PHDI) also plays a role in shaping policy and customs in Bali (Arjawa and Jayantiari 2010).

2.1.2 Development and Environmental Concern in Bali

Despite the economic development and other benefits that tourism has brought, it has also caused adverse impacts on the environment and social life in Bali. Sutawa (2012) has highlighted three major negative impacts in Bali that can be attributed to tourism: adverse impact of foreign cultures, land use change, and diminishing carrying capacity of water supplies. While Western culture has definitely had an increasing influence on local residents, the in-migration of domestic workforce from all over Indonesia has also raised concerns regarding the future of Bali's social fabric due to cultural differences (Siadis 2014). Development spurred by the growth of tourism has also caused increasing inequality – leaving behind the agricultural society of northern Bali which is struggling with rising costs of living (Rosalina and Putra 2017). The increasing dependence on tourism creates economic vulnerability – when Mount Agung erupted briefly in 2017, the economic loss it caused was estimated to be almost \$700 million (Kementerian Pariwisata Indonesia 2018).

The most visible impacts of tourism is probably land conversion, especially the transformation of agricultural land (i.e., rice fields) to, mostly, tourist accommodations (As-Syakur 2011; Lanya et al. 2015). This not only reduces the catchment surface, but also increases sedimentation in coastal water. This is especially true in cases such as the port reclamation and toll road projects in Benoa Bay (Tanto et al. 2017). The increasing demand for freshwater and the inadequacy of the public water infrastructure also heightening groundwater scarcity and saltwater intrusion. These are further aggravated by sea level rise (IDEP and PNB 2014). Severe coastal erosion has affected an estimated 102 km of coastline, of which only about 60 km has been addressed (mainly by the construction of rock armor) (Raperda RZWP3K, 2017).

The increasing demand for coastal space (both on land and sea) has also heightened conflicts between sectors, especially between the “sea-, sand-, and sun-” seeking tourism. Suartika (2015) highlights the conflicts between traditional ceremony (such as the purification ritual that uses the sea water and space), provision of basic living needs, tourism industry, and environmental protection.

2.1.3 TSP and MSP Development in Bali

In Bali, the TSP is developed by the provincial Public Works and Spatial Planning Agency (*Dinas PUPR*) while the MSP is the responsibility of the Maritime Affairs and Fisheries Agency (DKP), as per the national policy set by the corresponding ministries. Following the national law (Law Number 27 Year 2007) that requires every province to develop its MSP, Bali is currently developing theirs. On the other hand, the latest TSP for the province of Bali was created in 2009 (which is valid for 20 years until 2029). It is currently being reviewed (as per the regulation that allows for revision for every five years) to take account of the latest regulations, vision, policies, and development. One of the most outstanding pressures for the revision of the plan is the reclamation project in Benoa Bay.

Work on the provincial and regencies/city MSPs in Bali had begun before 2014. Under the previous law, provinces and coastal regencies/cities were required to develop MSPs for sea-space under different spatial jurisdiction and scale. However, because of the change in national legislation with regards to regional governance and maritime jurisdiction (due to issues with abuse of power by the regents and mayors in natural resource management), the provincial governments have to incorporate additional marine space that was formerly under the jurisdiction of regency/city government (UU Number 23 Year 2014). Thus, the province of Bali, spearheaded by

the DKP, began to redevelop the MSP to incorporate the additional sea space. This process began in 2017 and is expected to be completed in 2019 (after two years delay).

Not unlike the other provinces, the TSP in Bali was developed long before the MSP. Thus, the MSP has to take account of the existing TSP. However, it is currently developed at, relatively, the same time with the TSP revision, which provides an opportunity to look at how the planning process for the two plans can be coordinated. This also provides an opportunity to assess the integration (or, as written in the regulation, “synchronous, harmonious, and balanced” relationship) between the two plans in Bali and Indonesia, which is sought after, but never clearly defined, and, as my research found, have been interpreted differently by different institutions and individuals.

2.2 Literature Review

Since MSP is quite new (as well as ways of ensuring integration with TSP), it is important to examine the most recent scientific research on this topic. I have relied on recently published works to answer the following question: 1) What is the current state of the art on integrated land-sea spatial planning/management, 2) Why integration of land-sea planning is important, 3) What are the challenges to achieve them, and 4) How can integration of the MSP and TSP in Bali and Indonesia best be accomplished?

I targeted the Scopus and EBSCOhost journal database, using search terms related to the integration of TSP and MSP. I looked specifically for papers written in English, published between 2000 and the end of November 2018) and followed the search terms summarized in Table 3 below. My search yielded more than 300 publications. Each was screened to determine its relevance to land-sea planning. 192 papers were further reviewed and classified based on the region of interest, purpose, and measure of integration.

Search Terms	Scopus	EBSCOhost
integrated AND terrestrial AND marine AND planning	36	30
integrated AND land AND sea AND planning	54	59
institution AND terrestrial AND marine AND planning	12	4
institution AND land AND sea AND planning	19	11
land AND use AND planning AND ocean AND zoning	17	10
TOTAL	121	99
	192	

Table 3. Publication search terms and results

2.3 Policy and Institutional Analysis of TSP and MSP

I concentrated on the institutional aspect and policy of Indonesian spatial planning. In this section, I sought to determine:

- How the government and various institutions (national and local) within the context of coastal planning and management define cross-realm considerations and integration (or synchronization)? Does view of integration vary from one sector to another and across hierarchy (local-national)?
- How does the existing planning framework seek to consider cross-realm interactions? How is it actually taken into account in practice (in Bali)?
- What are the barriers and challenges of integration? Where are the opportunities for integration? What is the potential benefit of integration?

In the end, I used something called the Social-Ecological System (SES) Framework to explore the interrelationships between land and sea planning (and management) as well as to organize prevailing assumptions about integration.

2.3.1 Social-Ecological System (SES) Framework

I thought I might begin with the Institutional Analysis and Development (IAD) Framework created by Elinor Ostrom (2011). It was developed from her seminal studies on the management of common-pool resources (CPR) that looked at how people establish ‘institution’ to govern and

manage the commons collectively (Elinor Ostrom 1990). IAD framework has been used for various policy analysis that relates a set of concepts (Figure 9a) in a collective choice problem with action arena at its center where actors interact within the established rule/structure (Elinor Ostrom 2011). However, the IAD framework does not include variables that characterize “the biophysical world” or its relationship to the social system, which is important for ecologist or environmental policy analysis. To address these missing items, Ostrom and her colleagues developed a new social-ecological system (SES) framework (E. Ostrom 2007; McGinnis and Ostrom 2014). SES framework provides a basic vocabulary of concepts and relationships that can be used to illustrate an ecological system that is intricately linked to a social system (Anderies, Janssen, and Ostrom 2004). Similar to the IAD framework, at the center of the SES framework is the action situation. This is based on the idea that social actors and governance system generate interactions and outcomes which are, in turn, affected by (and affect) the resource system (Figure 9b) (Elinor Ostrom 2011; McGinnis and Ostrom 2014). I will be using this framework to compare the institutional setting of both TSP and MSP in Indonesia (and Bali) and see how they interact with each other according to the existing rule and structure within the context of Land-Sea Socio-Ecological System (LS SES).

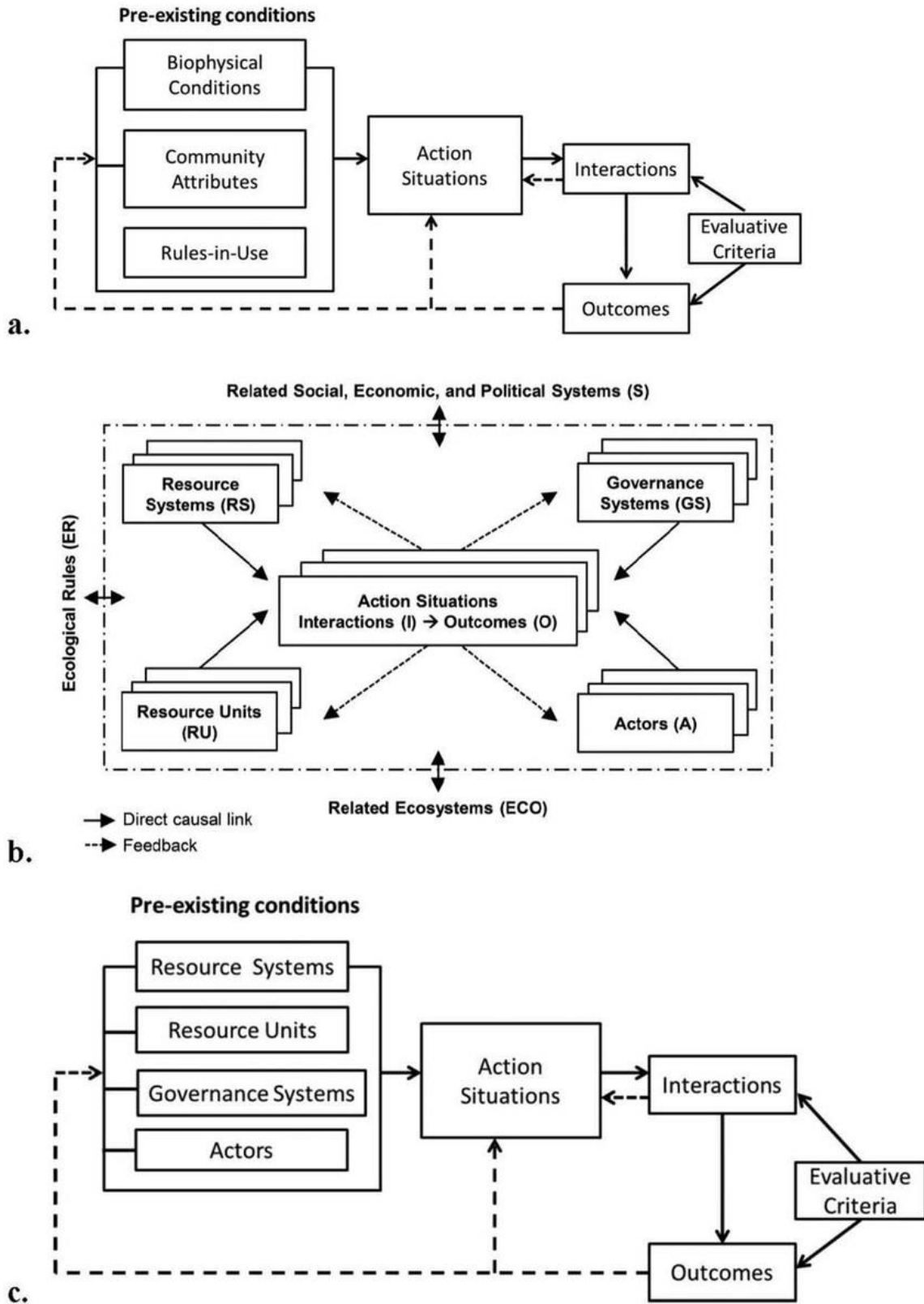


Figure 9. (a) The IAD Framework, (b) the SES Framework, and (c) the Combined IAD-SES Framework. (Cole, Epstein, and McGinnis 2014)

The Land-Sea Socio-Ecological System (LS-SES) is defined as

an inherently linked and interdependent set of social and ecological actors, elements and entities that are found across the land-sea interface, or occupy both the land and sea domains. (Pittman and Armitage 2016).

Based on this definition, I use the assortment of variables from the SES Framework (Table 4) to unpack the components and variables of MSP and TSP policy in Indonesia (based on the documents and interview data) and analyze how the actors, governance system, resource system and unit interacts within the action situation. This has given me a way to compare the two planning regimes systematically. Then, I zoomed into the case study to see how the integration of MSP and TSP is defined and applied by the institutions as well as predicting the outcome of the current policy. Finally, I generalize the finding from the case study to national policy and evaluate the planning system with the theories of integration from the literature research. Indeed, the MSP and TSP has been coordinated to a certain extent (in a *post-hoc* manner), but definitely not in an integrated manner and there is a lack of interest on the government side to push for a more integrated planning mode. The conclusion of this analysis will be the basis of policy recommendation for future MSP and TSP development and policy in Bali and Indonesia.

First-tier variable	Second-tier variables
Social, economic, and political settings (S)	S1 – Economic development S2 – Demographic trends S3 – Political stability S4 – Other governance systems S5 – Markets S6 – Media organizations S7 – Technology
Resource systems (RS)	RS1 – Sector (e.g., water, forests, pasture, fish) RS2 – Clarity of system boundaries RS3 – Size of resource system RS4 – Human-constructed facilities RS5 – Productivity of system RS6 – Equilibrium properties RS7 – Predictability of system dynamics RS8 – Storage characteristics RS9 – Location
Governance systems (GS)	GS1 – Government organizations GS2 – Nongovernment organizations GS3 – Network structure GS4 – Property-rights systems GS5 – Operational-choice rules GS6 – Collective-choice rules GS7 – Constitutional-choice rules GS8 – Monitoring and sanctioning rules
Resource units (RU)	RU1 – Resource unit mobility RU2 – Growth or replacement rate RU3 – Interaction among resource units RU4 – Economic value RU5 – Number of units RU6 – Distinctive characteristics RU7 – Spatial and temporal distribution
Actors (A)	A1 – Number of relevant actors A2 – Socioeconomic attributes A3 – History or past experiences A4 – Location A5 – Leadership/entrepreneurship A6 – Norms (trust-reciprocity)/social capital A7 – Knowledge of SES/mental models A8 – Importance of resource (dependence) A9 – Technologies available
Action situations: Interactions (I) → Outcomes (O)	I1 – Harvesting I2 – Information sharing I3 – Deliberation processes I4 – Conflicts I5 – Investment activities I6 – Lobbying activities I7 – Self-organizing activities I8 – Networking activities I9 – Monitoring activities I10 – Evaluative activities O1 – Social performance measures (e.g., efficiency, equity, accountability, sustainability) O2 – Ecological performance measures (e.g., overharvested, resilience, biodiversity, sustainability) O3 – Externalities to other SESs
Related ecosystems (ECO)	ECO1 – Climate patterns ECO2 – Pollution patterns ECO3 – Flows into and out of focal SES

Table 4. SES Framework second-tier variables (McGinnis and Ostrom 2014)

2.3.2 Data

I completed two sets of interviews during my fieldwork in July-August 2018 and remote interviews in October-December 2018. For the first set of interviews, respondents were selected from the members of the MSP planning team that was created by the Governor of Bali (Kepgub Bali No. 739 Year 2017). In total, I contacted officials from 27 of the 40 participating institutions. Nineteen people representing 13 institutions were willing to be interviewed face-to-face. They represent provincial government agencies' officials, environmental NGOs, academics, and consultants. No public interest groups or community organization were willing or able to be interviewed. Most of the person that declined to be interviewed (including other government officials) suggested me to contact the maritime and fisheries agency (DKP) official directly since they are considered to be the one 'making' the plan. They also appear to be hesitant to be contacted because the MSP is being viewed as a technical and esoteric matter that are beyond their expertise to talk about. However, I managed to get some information about their opinions from other interviewees (NGOs and academics) as well as relevant news that was covered by the media. Table 5 below summarized the institutions represented in the first set of interviews.

The second set of interviews focused on central government ministries. I was able to interview representatives from four relevant ministries that were closely involved in spatial planning policies of both land and sea. I contacted the officials using the snowball method, based on the recommendations and contacts mentioned by the previous officials that I have interviewed. Table 6 below summarized the represented ministries. For both sets of interviews, I used semi-structured interviews with questions that were prepared beforehand to seek interviewees' opinion on their experiences with the MSP and TSP planning efforts. All these conversations are recorded (with the exception of one government official from the Tourism Department of Bali), and they

range from 40 minutes to 3 hours. My interview guideline and full list of interviewees are listed in Appendix A and B.

Organization	Count
1. Provincial Government Official	
a. Maritime and Fisheries Agency	3
b. Public Works and Housing Agency	1
c. Environmental Agency	1
d. Tourism Agency	3
e. Transportation Agency	2
f. Regional Planning Agency	1
g. Regional Disaster Management Agency	1
2. NGO	
a. Conservation International	2
b. Coral Triangle Center	1
3. Academic	
a. Udayana University	2
b. Warmadewa University	1
4. Consultants	
a. CV. Rekako	1
b. PT. Wartha Bakti Mandala	1
TOTAL	20

Table 5. Summary of interviewees (1st series)

Ministry	Count
Maritime Affair and Fisheries	5
Internal Affairs	2
National Planning Agency	2
Agrarian Affairs and Spatial Planning	1
TOTAL	10

Table 6. Summary of interviewees (2nd series)

Finally, I analyzed secondary data such as government documents that are downloadable from public, online repositories (rules, regulations, guidelines, etc.), planning documents (minute of meetings, signed agreements, plans, etc.) provided by government officials and local NGO, as well as media coverage on planning-related matters.

2.3.3 Limitation, Problem, and Concern

Through this research, I made inferences about national policy from my analysis of one province. Indeed, Bali is only one out of the thirty-four provinces in Indonesia. It has a unique

geographical characteristic in comparison to other provinces, not to mention its socio-cultural setting and its unique development pressures. However, spatial planning governance system in Indonesia is controlled by the national government and thus would be relatively uniform throughout all provinces. In addition, I was able to interview national officials in a position to offer comparative perspectives from across the country. Moreover, since the plans I was studying have not yet been implemented and evaluated, there are no data or research that has been done on the efficacy of these plans (especially the MSP). However, I would argue that it is still very important to analyze the policy, predict the result, and prescribe a better approach and policy to improve the spatial planning regimes on both land and sea. Finally, there is also issue with representation in the research since no public groups or community organization representative willing to be interviewed (except for the NGO). Although it reduces the ability to analyze the whole picture of MSP and TSP development in Bali, I have chosen to focus more on what the government could do (or could have done) to improve the integration of both plans.

Chapter III.

Literature Review

MSP is a relatively novel concept compared to its terrestrial counterpart. Relative to that, the idea of integrating the two planning realms is even more recent and less explored, whether in practice or academic settings. To study this, I drew a systematic review of 192 peer-reviewed papers on land-sea planning to

- examine the current state of literature about land-sea spatial planning
- discover the predominant land-sea considerations and approaches being taken to address them
- investigate challenges of integrated land and sea spatial planning regimes, and
- seek insights on how can integrated land-sea planning best be achieved

The review finds that the number of publications related to land-sea planning has been increasing since 2000. Some of the most important considerations in the integration of land-sea planning are related to sea level rise impact mitigation and environmental conservation (especially in the context of marine protected areas). Most publications highlighted the importance of addressing the land-sea interaction in the context of the land/sea/coastal planning and management. The most predominant approach discussed in addressing land-sea interaction is integrated coastal zone management (ICZM). Some of the challenges that are often mentioned in the articles are conflicting administrative boundaries and sectoral authorities, lack of sufficient data, and capacity. At the end of this chapter, I presented a brief comparison of selected countries' (UK, China, and Australia) institutional arrangement and policies of TSP and MSP to ground the conceptual discourse and provide more context on spatial planning around the world.

3.1 Land-Sea Planning Related Publications

Based on the search protocol outlined in Chapter 2, I retrieved 192 publications from Scopus and EBSCOhost combined. Most of them (~80%) were published in the 2010s period. As can be seen in Figure 10 below, the number of publications related to land-sea planning/management has been increasing.

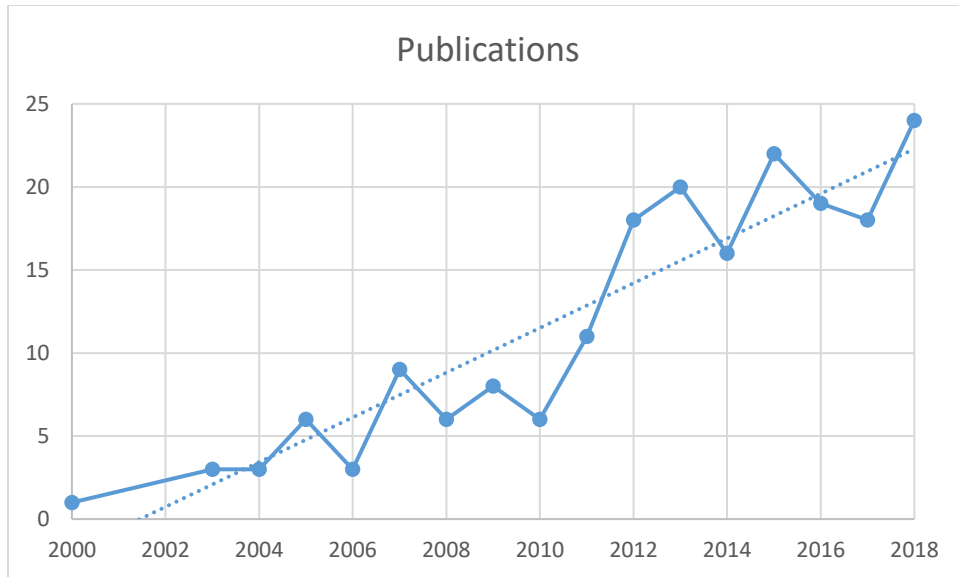


Figure 10. Number of Publications per Year (2000-2018)

In terms of the region under discussion, the retrieved publications examine land-sea planning in (followed by number of publications in descending order): Europe (64), America (36, out of which, 24 specifically about USA), Asia (36, majority from China), Australia & Oceania (25), Africa (7), and land-sea planning issue in general (28). The majority of publications that discuss land-sea planning in Europe mostly cover MSP development in the United Kingdom, which is also one of the first proponents of MSP.

I have identified several major topics in the publications, which are mostly discussed land-sea management/planning in the context of Integrated Coastal Zone Management (97), Marine Spatial Planning (46), Conservation (37), and Climate Change Adaptation (37), among others.

3.2 Land-Sea Consideration, Integrated Approach, and Challenge

This section will outline the findings with regards to the consideration/concern for integrating the MSP and TSP, theories or approaches taken to integrate the two planning realms, and the challenge of integration.

3.2.1 Land-Sea Consideration in Spatial Planning

Land and sea are interconnected in an intricate way, especially in the coastal zone. Alvarez-Romero (2011) outlined three classifications of interactions between land and sea that are important, especially, for systematic conservation planning: 1) natural ecological process (e.g., rainwater runoff, salmon returning to its birthplace), 2) cross-system threats that originate from one realm to another (such as sedimentation/pollution degrading coral reef system and saltwater intrusion of freshwater reservoir), and 3) socioeconomic interaction related to management decision and action (i.e., reclamation project). These kinds of interactions need to be considered in the spatial planning of both realms. Without coordination or integration of the two planning realms, the intended objectives of MSP (and also TSP) may not be achieved optimally (H. D. Smith et al. 2011b).

The first aspect that is considered in spatial planning is the natural ecological process that happens in both realms and across land-sea realms. One of the most studied natural process (geophysical) is sea level rise phenomenon that is affecting the coastal zone. Many literatures discussed this broad issue under various topics such as sea level rise (or flood risk management, adaptation, and mitigation) (Birch and Reyes 2018; Hanak and Moreno 2012; Virkki, Kallio, and Orenius 2006), coastal erosion and protection (Ahlhorn, Meyerdirks, and Klenke 2010; Anton et al. 2017; Boateng 2012), and the less occasional storm surge (Liu et al. 2018; Sorensen et al. 2016). It also causes serious concern for small island developing states (SIDS), since it affects their

sovereignty and livelihood (Mycoo 2014). Another impact of sea level rise (that is often aggravated by coastal development) is the saltwater intrusion into groundwater aquifers (Satriani et al. 2012; Priyono 2004; Li et al. 2018). Additionally, although least occasional, is the preparedness of disastrous hazards, such as tsunami and earthquake affecting coastal region (Suppasri et al. 2015). These concerns above are characterized more by natural processes that occur in the sea that is affecting the land. On the other hand, geophysical processes from the land also affect the sea significantly through surface water system in catchment zone (Winter et al. 2011; Andersson, Petersson, and Jarsjö 2012; J. Hall et al. 2011) and sediment transport that carries suspended solids, organic matters, and nutrients (Dale et al. 2016; Lebel 2012; Herr and Kuhnert 2007). Other natural process includes the biological process from organisms that either live in two realms or migrating across the two realms at a certain period (anadromous and catadromous species), which is a very important consideration for conservation planning (Jacob, Thorin, and Pioch 2018; Makino et al. 2013).

The next aspect of considerations is related to human activities that have or might have a direct or indirect impact on the stock and flow of the ecosystem (on both or across-realms). Most activities that are considered in spatial planning is related to activities within the terrestrial realm that directly affect the sea or indirectly through surface water transport from the catchment area. One obvious example is the point or non-point source pollution and waste from industries, household, and agriculture (Ibrahim 2013; Rude et al. 2016). Land use and land cover change, as well as the development of dams (or other water management system), also affect the rate of sedimentation and even erosion (Anton et al. 2017; Lebel 2012; Arthington et al. 2016). As a result, heightened suspended solids and nutrients (and even toxic substances) may affect marine life negatively, especially coral reef ecosystem (Rude et al. 2016; Pittman and Armitage 2016; Klein

et al. 2012). Unregulated groundwater extraction also affects the rate of saltwater intrusion, which is often aggravated by sea level rise problem (Li et al. 2018). On the marine side, mining (mostly oil and gas) and shipping activities often involved the creation of pollution that affects marine life and sometimes the terrestrial ecosystem as well as coastal population livelihood (especially in a disastrous scenario such as massive oil spill) (Cao and Wong 2007). A construction project in the marine space (such as reclamation, port, or coastal protection) may reduce natural habitat and affect the coastal sediment process, creating deposition or erosion of the coastline (Stoms et al. 2005; Siddiqui and Maajid 2004; Momirski 2017; Perveen, Kishor, and Mohanty 2014).

The last set of consideration is how the human activities (and its impact on the environment) affect social, economic, and cultural aspect (and vice versa). Population growth and economic development have been considered as major driving forces behind various anthropogenic impact on many issues that have been outlined above. Demand for resources (space, food, etc.) is the leading cause for urbanization, land use conversion (especially from forest to agriculture), and increased industrial development that heightened erosion and effluent discharge (Ciftcioglu 2018; Karrasch, Klenke, and Woltjer 2014; Panagou, Kokkali, and Stratigea 2018). Increasing shipping activity and demand for space in the coastal zone also increased the development of ports (deepening, expansion, and new port) and reclamations (Kim and Park 2013; Siddiqui and Maajid 2004; Momirski 2017). Expansion of coastal tourism is a serious consideration in planning due to various activities (and supporting activities) that occur within two realms and how it affect the coastal communities (Mycoo 2014; Anker, Nellemann, and Sverdrup-Jensen 2004; Maguigad, King, and Cottrell 2015). Sustainable energy production through wind and wave farms (especially in the EU) in the sea space is becoming a concern for the shipping industry and coastal communities due to its impact on the operation and coastal landscape aesthetic

(Börger, Hooper, and Austen 2015; Veidemane and Nikodemus 2015). These developments also have the potential of marginalizing the traditional and indigenous coastal communities (Alvarez-Romero et al. 2011). Intensification of these activities and development further increase competition of use among them. For example, increasing sedimentation could affect coastal tourism as well as the fishing industry. Marine conservation policy could also hurt local fisheries and lead the population to increase activities in the land, potentially undermining the conservation effort itself (Alvarez-Romero et al. 2011). Managing competing objectives within and across the two realms then become very important but also difficult because of the complex interaction and interrelationship within and across the two domains.

3.2.2 How to Integrate (or Coordinate) TSP and MSP

Although land-sea interaction is universally acknowledged as an important consideration in spatial planning, there is no consensus on how to integrate TSP and MSP. There are several proposed (and established) framework to integrate them and techniques to ensure land-sea interaction is embedded or considered in either one or both plans. This subsection will present the approaches taken and mentioned within the literature. The methods vary from case to case, since every place have different land-sea consideration, challenges, regulation, and institutional arrangement. Although there are no general recipes that can be uniformly applied to integrate TSP and MSP, there are lessons that can be taken from these approaches. They are mostly related to the importance of: policy and regulation fitness to the institutional arrangement; the presence of coordinating body/agency; extension of the area of analysis beyond the spatial planning boundary, and planning with uncertainty in mind.

One of the first approaches to minimizing land-sea conflict is through the integrated coastal zone management (ICZM) that view the coastal ecosystem and management policy holistically

(Forst 2009). It is the predominant approach taken by countries around the world. However, there are variations of ICZM implementation on various aspects such as the institution, regulation, and spatial jurisdiction. Several countries created a new institution or program such as the Coastal System Operations Center (CSOC) in Romania and Coastal Concordat in England that serve as a coordinating bodies that harmonizes policies and program in the coastal region and also act as a single point of contact for development control purpose (Gruber et al. 2010; Turner and Essex 2016). Stojanovic and Barker (2008) also suggest that local Coastal Partnerships in the UK could help link the TSP and MSP, and need to be included within the institutional framework. The role of stakeholders participation cannot be understated (Čok 2017; Lebel 2012), especially with regards to the local/traditional/indigenous coastal community not only for conflict mitigation but also for vernacular land-sea knowledge (Austin et al. 2017; Clarke and Jupiter 2010). Pittman (2016) highlighted the importance of understanding the network of governance within the land-sea socio-ecological system (LS-SES), where actors with power could create biases toward a certain territory (land or sea). Compulsory procedures such as adoption of the strategic environmental assessment (SEA) of the land-sea ecosystem to be adopted in spatial planning (Glegg, Jefferson, and Fletcher 2015) or environmental impact assessment (EIA) for large scale coastal development that may have a significant impact on the land-sea environment (Douvere et al. 2007). However, it could also be perceived to be increasing the risk and cost to small scale developers (Turner and Essex 2016; Kerr, Johnson, and Side 2014).

Alvarez-Romero (2015) proposed a novel integrated operational framework to guide land-sea spatial planning that highlighted several critical components in MSP and TSP that need to be planned closely such as: stakeholder identification, governance analysis, mapping of land-sea uses, multiple objectives setting, threats and features modelling, management actions portfolio,

assessment of co-benefits & tradeoffs. Tallis, Ferdana, and Gray (2008) classify three degrees of integration in planning: concurrent (where both TSP and MSP planned separately with some harmonization effort afterward), simultaneously (both planned with multiple systems analyzed to achieve multiple objectives simultaneously), and integrated (where analysis set around multiple systems and cross-system threats). However, some also considered ‘full integration’ to be the wrong term since the difference between the two to be too great and instead argued that greater coordination should be pursued (Kerr, Johnson, and Side 2014).

On the technical side, there have been various proposal to help improve integration of land-sea planning. Several spatial ridge-to-reef models that are used to predict land use impact on the downstream marine ecosystem have been developed and implemented in several places for conservation purpose (Rude et al. 2016; Álvarez-Romero et al. 2015; Klein et al. 2018). Decision support tools (using GIS software) such as MARXAN and NatureServe Vista have been used to help optimize spatial allocation within a certain land-sea socio-ecological system constraint and desired objective, which helps with solving complex trade-off between multiple objectives and realms (Domínguez-Tejo et al. 2016; Natureserve 2016). Web-based participatory spatial planning tool such as Marinemap and Seasketch (for MSP) have also been proven to be helpful for facilitating collaborative planning in marine and coastal environment (Retzlaff and LeBleu 2018; Pomeroy, Ferrer, and Pedrajas 2017). To better understand the complexity of land-sea interaction spatially, Ding (2017) proposed a method called ARCLUSM that employs data mining method and remote sensing to analyze the spatial pattern in the coastal zone, across the land-sea boundary. However, despite the best scientific knowledge, the complexity of land-sea interaction is not fully understood, which means that there are still a lot of uncertainties that need to be addressed. Quantitative risk assessment (also called: hazard valuation, vulnerability analysis) is utilized in

several researches (often embedded in SEA) to provide a room for future adaptation or response in the face of undesirable situation that may arise with regards to land-sea issues (Dale et al. 2016; Anton et al. 2017; Retzlaff and LeBleu 2018; Forst 2009). One of the examples of the implementation for the risk-based approach in planning is the determination of coastal setback line as a way to mitigate coastal erosion (Jongejan, Ranasinghe, and Vrijling 2011; Bin Nordin 2006).

3.2.3 The Challenge of Integrating TSP and MSP

MSP and TSP are substantially different on various dimension, and it poses challenges for the two of them to be planned in an integrative manner. Review of literature highlighted several challenges that can be broken down into two main issues: institutional (and management) constraint and technical challenges.

Land use and sea resources have been historically managed and governed differently. Kerr and Johnson (2014) highlighted that the land and sea has been historically managed under different legislation, mode of governance, and practice. While the institution of land management is not perfect either, the management of ocean use has been characterized as extremely complex and conducted in a very sectoral fashion in comparison to its landward counterpart (Botero et al. 2016; Ibrahim 2013). Usually, there are various sectors or agencies involved with ocean management with overlapping jurisdiction (that sometimes extended and overlap with the landward management authorities) and authority with poor coordination mechanism (Huggett, Southgate, and Thompson 2003; Cao and Wong 2007; Gruber et al. 2010; Glegg, Jefferson, and Fletcher 2015). Legal property rights in the land have been generally acknowledged as “private”, while the rights to sea space have been largely considered as common, which create disparity for licensing and permitting system (Kidd and Shaw 2014). Since MSP is relatively new, the regulations and laws governing it is still changing and evolving which made any effort to align it with TSP seems

to be uncertain (Anton et al. 2017). Any change to this will require significant adjustment to the legislation and institutional arrangement, which is complicated and it is going to demand considerable political willingness since some actors might lose their authority or privilege in comparison to the current, strictly separated planning regime (Esbah, Tokus, and Baskaya 2011; Agardy 2010; Evadzi et al. 2018).

Decision-making process in land-sea spatial planning is also challenging. One of the issue with participation in MSP is low public awareness in comparison to TSP (Clarke and Jupiter 2010; Evadzi et al. 2018). This also affects the perception of importance and bias toward terrestrial perspective (Alamsyah 2017). The complexity of land-sea interaction also made the process of knowledge dissemination and information sharing difficult (Hull 2013). There is also a complex trade-off of between land-sea allocation from the complex inter-relationship and conflicting interests (Klein et al. 2014; Makino et al. 2013; McGowan et al. 2018). Stakeholder mapping and participation for land-sea planning are difficult since there are inherent conflicting interests between them (Glegg, Jefferson, and Fletcher 2015; Bohnet 2010; Cao and Wong 2007).

As mentioned before, one significant concern with sea planning is that ocean dynamic as well as its relationship to its landward counterpart is not fully understood (Klein et al. 2014). Data and researches on MSP, let alone land-sea planning, are limited and not widely available (Veidemane and Nikodemus 2015; Ding et al. 2017; Abramic et al. 2018; Cao and Wong 2007). There are still considerable limitations on the model and data reliability used for planning (Stoms et al. 2005; Lecours 2017; Del Río and Gracia 2009; Panagou, Kokkali, and Stratigea 2018). The high cost of collecting data and conducting research for MSP also pose some financial constraint for states developing MSP and TSP (Retzlaff and LeBleu 2018). These issues, in turn, cause high uncertainty with regards to spatial planning in the land-sea environment (Pittman and Armitage

2016; Alvarez-Romero et al. 2011). Lack of capacity for MSP (especially from the government side) is also considered important since MSP is relatively new and will take some time to develop the capability for planning this in parallel to the TSP (Mycoo 2014). MSP and TSP often being planned on a mismatched spatial scale, which may affect perception and decision making (Jacob, Thorin, and Pioch 2018). Lastly, there has not been many research and evaluation of the efficacy of MSP by itself (and its relationship to TSP) so far (Tallis, Ferdaña, and Gray 2008).

3.3 Land-Sea Planning Around the World

This section presents a comparison of MSP and TSP history, institutional framework, integration effort and challenge in three countries: UK, Australia, and China. The institutions and regulations governing MSP and TSP, as well as the approaches in coordinating the two plans in these countries are different. However, there are some similarities among them, such as the importance of a strong legal basis for MSP and their regional boundaries that stretched beyond state/provincial administrative boundaries (ecosystem-based management).

United Kingdom (England)

In the UK, land use planning has been developed and existed since the Town and Country Planning Act of 1947, which has been established into Planning and Compulsory Purchase Act of 2004. Under this regulation, England is divided into nine planning regions that has its regional planning bodies enacted by the secretary of state. Lower level government (i.e., town, district) develop their land use plan in accordance with the regional plan.

The legal basis for MSP is the 2009 Marine and Coastal Access Act. It outlines the creation of Marine Management Organisation (MMO), a non-departmental public body under the Department of Environment, Food, and Rural Affairs (DEFRA) that is tasked to plan and manage

marine activities in the surrounding seas. The regional planning zone divided into 11 planning regions (it is not aligned with the terrestrial planning region).

Within the Marine Policy Statement (under the 2009 Act), there are various normative requirements to consider the terrestrial plan. However, there is no reciprocal statute in the opposite direction. One of the recent programs of DEFRA's MMO is the Coastal Concordat, a non-mandatory initiative that invites local authorities to cooperate with other government bodies to consent on coordinating licensing process in the intertidal/coastal zone. One of its inventions is a consenting agreement on one single body of authority to be in charge of a single point of entry for development (permit/license) application and coordinate planning for both land and sea. Some of the challenges for integration are the various mode of governance (not only cross realms, but also cross region), lack of interest from local authorities to participate in integration, and high influence of multilateral directive (EU's MSP Directive, Integrated Maritime Policy) (Turner and Essex 2016).

Australia

Each state and territory in Australia (6 states and two federal territories) developed their own legislation regarding the governance of land use. Generally, local government authorities, under the ultimate control of state planning departments, have the power and responsibility to draw up zoning schemes within their boundaries as well as regulating the permitting and licensing system. The federal government has very limited land and control over the management of land use.

Some would argue that MSP was originally created in Australia through Great Barrier Reef Act of 1975, and the subsequent Marine Park Zoning Plan in 1982, which created a separate institution and management framework for, mainly, conservation of the marine environment. At

the national level, the MSP is established under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999. It created a framework for MSP development under the Commonwealth jurisdiction (from 3 to 200 miles away from the shore) and subdivided into four Marine Bioregional Plans (MBP). The development of these plans is the authority of the Department of Environment and Energy. The states and federal territories have limited jurisdiction over the territorial water (up to 3 nautical miles), but there is no systematic MSP statute that is comparable to the MBP at the state level (Vince 2013).

Coordination between land and sea planning is greatly considered in the context of marine protected areas. A lot of researches and development has been done for systematic conservation planning of land-sea realms. However, at the state and federal level, there is a mismatch between the TSP and the federal MBP, and there is no compulsory and systematic mechanism for coordination between federal and state government spatial planning across the two realms.

China

In China, land use planning is a top-down exercise with strong hierarchical framework. The spatial plan is divided into two: national spatial plan (developed by the Ministry of Land and Resources) and the urban & rural plan (developed by the Ministry of Housing and Urban-Rural Development) under the Land Administration Law (Adopted 2004) and Urban and Rural Planning Law (Order No. 74 Year 2007). Administratively, both types of plan are divided into five levels (in descending order): national, province, prefecture, county, and township. The national planning (or the higher level) became the guideline for the lower level land use planning.

MSP is known as Marine Functional Zone (MFZ) in China. At the national level, it falls under the jurisdiction of the State Oceanic Administration (SOA) that administers the MFZ on four regional bodies that cover eleven coastal provinces of China. The MFZ is also developed by local

coastal governments at the provincial, municipal, and county level. The legal basis for MFZ is the Law of Management of Sea Use 2001 (Order No.61 2001) (Fang et al. 2018).

The law requires land use/coastal plan to be ‘dovetailed’ with the MFZ. However, no specific framework has been developed to take into account this relationship on the landward side. Recently, there has been greater call to expand MFZ landward to consider the land space because of the increasing pollution problem. Interestingly, many experimental researches on planning techniques to consider land-sea interactions in spatial planning have been developed in China, ranging from multi-criteria decision tool, advanced remote sensing application, data mining, and various computerized, quantitative method. However, these methods do not have much attention, and there is no empirical research or evaluation of the efficacy of these methods yet.

As can be seen, the institutional settings and approaches taken by these three countries vary greatly. Table 7 below summarizes the regulations, institutions, and the way the three countries deal with both MSP and TSP, as well as the relationship between the two spatial planning regimes.

3.4 Summary

Land-sea interactions are considered to be very important and they need to be addressed in spatial planning by academics, practitioner, and governments. However, there is no consensus on the best framework for achieving integration or coordination of planning efforts between the two realms. Some commentators think full integration of the two cannot be achieved because of the differences and challenges unique to each domain. As can be seen from numerous examples, institutional/organizational arrangements and approaches to address the needs of coastal states vary greatly. Nevertheless, there are general principles for designing spatial planning policy for the coastal region. Data, model, and decision support system are still being developed, but these will only be useful if strong regulatory system and well-coordinated institution are in place.

	UK (England)	Australia	China
TSP			
<i>Legal Basis</i>	Town and Country Planning Act (1947), Planning and Compulsory Purchase Act (2004)	The federal government does not control land use zoning. Each state and federal territories developed their own land use regulation	Land Administration Law (Adopted in 2004) and Urban & Rural Planning Law (Order No. 74 Year 2007).
<i>Authority</i>	Regional planning bodies of nine regions and local government (town, county)	Local government (under the state authority) is authorized to develop TSP within their jurisdiction	Ministry of Land Resources takes care of the national spatial plan, and the Ministry of Housing and Rural Development deals with the urban & rural plan. Local governments also develop TSP within their jurisdiction in accordance with national spatial plan.
MSP			
<i>Legal Basis</i>	Marine and Coastal Access Act (2009)	Environment Protection and Biodiversity Conservation (EPBC) Act of 1999	Law of Management of Sea Use 2001
<i>Authority</i>	Marine Management Organisation (MMO), a non-departmental body under DEFRA	Department of Environment and Energy develop four marine bioregional plans for Commonwealth sea.	State Oceanic Administration (SOA) creates four regional marine functional zoning (MFZ) that is coordinated with provincial MFZ.
Integration of Land-Sea Planning	Terrestrial plan is required to be considered normatively. Coastal Concordat is a recent program to coordinate licensing and policies in coastal zone.	Considered for conservation planning, especially within MPA. Nationally, there is no framework for integration due to mismatch in institutional setting.	Land use zoning on the land adjacent to the sea need to be ‘dovetailed’ to the MFZ.

Table 7. TSP and MSP comparison of selected countries

Chapter IV.

Indonesian Spatial Planning Policy and Institutional Analysis

This chapter will analyze the land and sea spatial planning in Indonesia. First, spatial planning policies and institutional arrangement will be discussed using the SES Framework to get a detailed look at and compare the two spatial planning regimes at the national and local level. Then, I will summarize the findings to answer the following questions:

- How is the integration of TSP and MSP is defined in Indonesia?
- How is integration pursued in Indonesia?
- What is hindering a more integrated spatial planning in Indonesia?

From the analysis, I found that there has been some effort and policies made to harmonize the two plans in a *post-hoc* manner. However, there are some oversights with the current extent of ‘integration,’ and consequently, a more integrated approach is indeed desirable to achieve a better result, especially with regards to marine ecosystem sustainability.

4.1 Analysis of Spatial Planning Policy in Indonesia and Bali

This section outlines national spatial planning policy and institutional framework based on the laws, regulations, and guidelines that govern the development of TSP and MSP and then compare it to the implementation on the ground, with the analysis of the case study of Bali. The complete list of documents that are relevant to this discussion is listed in Appendix C. In this section, the institutional aspect of both planning regimes will first be broken down using the SES framework to systematically compare the variables that are relevant to both TSP (RTRW) and MSP (RZWP3K) at the provincial level in Indonesia and figure out the relationship between the

two. I divided the section into five subsections that represent the SES Framework's variables that I have used to organize the relevant institutional aspects of spatial planning:

1. Resource System (RS) and Resource Units (RU)
2. Actors (A) and Governance System (GS)
3. Related Social, Economic, and Political Setting (S) and Related Ecosystem (ECO)
4. Interactions (I)
5. Outcome (O)

Each variable will first discuss the national policy and regulation regarding spatial planning of both realms and then followed by the discussion of the TSP and MSP development in the Province of Bali. Table 8 below briefly summarizes the comparison of the most relevant SES Framework's variables between TSP and MSP in Indonesia. A comprehensive and detailed comparison of all variables is presented in Appendix X.

Variables		TSP (RTRW)	MSP (RZWP3K)
<i>Resource System (RS)</i>			
RS1	Sector	Forestry, fisheries, agriculture, mining & energy, industry, tourism, residential, commercial, defense, transportation.	Forestry-mangrove, fisheries, aquaculture, salt production, mining & energy, industry, tourism, transportation, defense, conservation.
RS2	Clarity of boundary	Clearly defined spatial terrestrial jurisdiction. Coastline administrative boundary is controlled by the National Geospatial Information Agency (BIG).	Well-defined marine spatial jurisdiction, 12 miles seaward from the coastline, and the delimited boundary between provinces or neighboring nations.
RS4	Human-Constructed Facilities /Infrastructure	Extensive human-constructed physical development on land, especially in urban region (buildings, infrastructure, and open spaces).	Limited human-constructed facilities on the sea space (reclaimed land, oil & gas extraction facility, non-vessel floating structures)
RS7	Predictability	Varies, but natural resource dynamic is generally more predictable.	Less predictability (greater uncertainty) of natural resource dynamics.
<i>Resource Units (RU)</i>			
RU7	Spatial or temporal distribution	Resource distribution within the space depends on the bio-geographical and geological landscape from the natural process. Human-made physical development and activities spatial distribution greatly depend on urban-rural development.	Generally, more valuable and biodiverse natural resources are located within space closer to the coastline. Similarly, human-made physical developments and activities also occur closer to the land.
<i>Actors (A)</i>			
A1	Group size	All stakeholders, among others: the population within the province (and neighboring provinces), customary law communities, and government (local and national).	Primary stakeholders, which are coastal and small island resource, such as traditional and modern fishermen, aquaculturist, tourism entrepreneur, and communities (local, traditional, and customary law).
A5	Leadership	At the provincial level, governor (and regional secretary) as the head of the province lead the development of spatial planning. The provincial agency in charge of spatial planning coordinate and lead the technical group.	At the provincial level, governor (and regional secretary) as the head of the province lead the development of spatial planning. The provincial agency in charge of maritime affairs and fisheries coordinate and lead the technical group.

Governance Systems (GS)

GS1	Government organization	National government develops the legislation for TSP. Local (provincial) government develop the TSP, which is delegated to the relevant agency. ATR-BPN ministry is in charge of setting up the procedure and guiding the province.	National government develops the legislation for MSP. Local (provincial) government develop the MSP, which is delegated to the relevant agency. Ministry of Maritime Affairs and Fisheries (KKP) is in charge of regulating the procedures.
GS3	Network structure	Combination of a top-down and bottom-up mode of planning and management (with movement toward greater public participation).	Combination of a top-down and bottom-up mode of planning. Greater consideration of public participation in planning.
GS4	Property right systems	Right to own land is an exclusive right for Indonesian citizen. Beyond land ownership, the government regulates property rights (license) for land use, building use, lease of property, forestry, and mining.	The state owns territorial sea. Two types of license can be issued for sea space utilization: location and management permit.
GS6	Collective-choice rules	The team composed of relevant regional government agencies and external technical experts develops the spatial plan. It requires some public participation through data and proposal consultation.	The team composed of relevant regional government agencies, external technical experts, and other NGOs that may be invited by the governor develops the spatial plan. It requires some public participation through proposal consultation.
GS7	Constitutional-choice rules	The national laws outline the rules for local governance and creation of TSP. ATR-BPN ministerial rule regulates the procedure that needs to be followed in TSP development.	The national laws outline the rules for local governance and creation of MSP. Ministry of Maritime Affairs and Fisheries creates the rule that regulates the procedure that needs to be followed in TSP development.
GS8	Monitoring and sanction	Monitoring of land use is authorized by the provincial and local government (and ministries' "technical implementation unit" where applicable).	Monitoring of land use is authorized by the provincial and local government (and ministry "technical implementation unit" where applicable). Other institutions may include Maritime Security Agency (Bakamla) or Water Police (Polair).

Interactions (I)

I3	Deliberation processes	Occurs during public consultation (minimum twice) of the planning process.	Occurs during public consultation (minimum twice) of the planning process.
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I4	Conflicts		Due to definitive property rights, there is relatively less conflict.	More (expected) conflicts due to less inalienability of sea (and coastal) space property regime.
<i>Related Social, Economic, and Political Setting (S)</i>				
S4	Other systems	governance	Community-level mode of governance, which have legal recognition especially in forest area (GS8).	Local-level governance, which is legally recognized, especially in a customary coastal community (GS8).
S5	Markets		Regulated market for land as property with clear legal recognition.	A marine spatial based permit is not tradeable. This applies not only for the private right but also for the customary and traditional right.
S7	Technology		GIS-based tool remote sensing and a wide array of IoT (internet of things) application.	Similar GIS-based tool and remote sensing. However, there is limited applicability in maritime context that affects data quality and quantity.
<i>Related Ecosystems (ECO)</i>				
ECO2	Pollution patterns		Varying household and industrial pollution.	Pollution comes from land-based sources through downstream action that may bring sediment, nutrients, toxic chemical, and trash.
ECO3	Flows into and out of focal SES		Various man-made flows from land use and land cover change.	Land-sea interaction may bring flows of material (sediment).

Table 8. Comparison of TSP and MSP in Indonesia with SES Framework variables

4.1.1 Resource System (RS) and Resource Units (RU)

- Indonesia (Policy and Regulation)

Resource system (RS2) in both spatial planning regimes covers the space under the jurisdiction of each province according to national law, which is the provincial administrative boundary for the TSP, and 12 miles seaward delineated from the coastline or delimited median line between two provinces for the MSP. The detailed coastline boundary information that separates the two realms is controlled by the Geospatial Information Agency (BIG) and has been firmly established now, such that there is no more overlapping spatial jurisdiction between the two plans, except for national strategic zones that may fall under the jurisdiction of national ministries.

Between the land and the sea, there is a significant difference in sectors (RS1) that are involved in spatial planning (although some are closely related). On the land, some of the major sectors that utilize the space and resources within it are agriculture, forestry, mining, residential, commercial, industry, and transportation. On the sea, these sectors dominate spatial and resource utilization: fisheries, aquaculture, mining, tourism, transportation, and conservation.

The built environment (RS4) is a significant consideration in spatial planning on the land. To a certain extent, the TSP as land use plan can be considered as an instrument that controls the physical development, especially buildings: their functions, forms, and dimensions. The network of infrastructure (mainly transportation, but also utilities) planning also made up a significant portion of the provincial TSP. In the sea, there are not many man-made structures that are fixedly built in place and considered for spatial planning, except for the growing concern for reclamation projects (especially the high-profile projects such as Jakarta Bay and Benoa Bay). Unlike the Western developed countries, utilization of sea space as offshore sustainable energy farm (wind or wave) is not the priority and does not drive the MSP development in Indonesia. However, networks

of infrastructure (such as underwater cables and pipes) and transportation (especially ship lanes) are also important aspects of MSP.

Ecosystem dynamics in the terrestrial realm is relatively well understood. However, the marine and coastal ecosystem dynamics is not very well understood due to technological and data limitation. The impact of rising sea level, global warming, ocean acidification, as well as the landward development/activity on the marine social-ecological system is a complex scientific topic that is still rife with uncertainty and unpredictability (RS7).

Unlike the land, the spatial distribution (RU7) of resources and activity on the sea is characterized by a higher intensity of distribution closer to the coastline. Hence, there is a heightened risk for conflict of interest in areas closer to the land. This is manifested in the finer grain of spatial zones closer to the land. There is some consideration with regards to the land-sea processes (such as sediment or nutrition transport) in MSP within the estuaries zone for suitability analysis of spatial allocation. Greater scale surface-water-process is considered within the catchment area plan (RPDAS) which is related to the TSP but not at all to MSP.

- Bali (in Practice)

The system boundary used for planning in both realms is the provincial administrative boundary defined by national regulation. The TSP area covers approximately 5636 sq.km of the terrestrial area, which contains nine regencies/city and 57 districts. It also includes 27 smaller islands outside the main island of Bali. On the other hand, the MSP covers about 9,289 sq.km of sea space based on the delineation of 12 miles maximum extent of jurisdiction and delimited line between provinces. It shares borders with eight regencies/city and 35 districts on the landward side along the 633 km coastline. Previously, the boundary between the two planning realms has been messy since there are many overlaps and gaps of jurisdiction due to incoherence in surveys and

differences in administrative boundary regulation (difference in high, low, and mean watermark coastline definition). Currently, the local and national government have agreed to use a national baseline and basemap that is determined by BIG (as part of the One Map Policy) for both TSP and MSP to eliminate the issue with administrative boundaries on the coast.

On the land, sectors that dominate economic development and spatial utilization are agriculture and tourism. Historically, Bali has been an agrarian society for centuries. However, the recent development of higher return, tourism-based economy (tertiary sector) has overshadowed the agriculture (primary) and manufacture (secondary) sectors. In 2013, tourism was estimated to make 67% contribution to the regional GDP. Spatially, agriculture still dominates spatial utilization at around 72% of total terrestrial space, according to 2018 data. However, in 2008 this number was measured at around 85%, suggesting more than 15% of the land cover change in a decade. Of these, some of the most dramatic reduction came from land use change from wet paddy field and plantation land into tourism-related development (such as accommodation, residential) and supporting infrastructure (roads, airport expansion). Population growth and in-migration from other provinces also drive the demand for space. High demand for space has caused massive infrastructure development such as roads that have increased in length by about 10% from 7,100 km in 2007 to 7844 km in 2013. Current air traffic flow has also put pressure on the airport expansion and the controversial new airport proposal in northern Bali.

Tourism and fisheries industries dominate the coastal sea utilization. Fisheries industry that uses sedentary sea space such as seaweed farm, fisheries aquaculture, and pearl farms take up about 1,200 hectares (12 sq.km.) of sea space in 2017. Capture fisheries zone is spread all around the main island with demersal fisheries mainly located in the southern part of the island and pelagic fisheries on the south and northeast of the main island. Out of the 16 designated tourism zones, 15

are located in the coastal zone. Utilization of spaces within this tourism area includes the use of sea space for marine attraction (such as SCUBA diving and surfing), construction of facilities for tourist attraction (such as floating pontoon), and development of supporting facilities (such as accommodation, food, and beverage industries). This development is also followed by growing concern and effort in conservation. The government with the support of several NGOs have worked on enacting marine protected areas (MPAs) in several locations in Bali to preserve, mostly, mangrove and coral reef ecosystem that are located on the coastline periphery. Bali is not known for mineral or oil and gas mining. However, there is also minor production of offshore sand mining in the southwest part of the island. Transportation and underwater infrastructure network mostly distributed in the southwestern part of Bali (in the strait between the main island and Nusa Penida) that connect the ports of the main island to Nusa Penida and neighboring provinces. On the western edge of Bali, the Gilimanuk Port serves as the gateway to Java Island that brought in substantial domestic tourists and goods for the island. It also serves as the connecting point for the submarine cable power that provides a significant amount of electricity for Bali.

The development of physical infrastructure and activities in the land and sea have noticeably made a socio-economic and environmental impact. Sources that I have interviewed unanimously agreed that physical and economic development in Bali has been very rapid and made a significant negative impact on the environment. One of the problems that was highlighted is the lack of preparedness from the government side to prevent environmental degradation. As I Made Sudarsana, the head of maritime division at the Provincial Maritime and Fisheries Agency (DKP) put it

“I feel that development in Bali is too rapid, relative to what was planned for. On the land, there are many developments that we have not thought about occurs frequently. Thus, there are many unexpected spatial utilization. This is what we want to avoid happening on the sea.”

Ngakan Kirim, head of planning division at the Provincial Public Works and Spatial Planning Agency (PUPR) also admitted that urbanization and development are very high and unstoppable due to its economic benefit as well as provincial government financial limitation for funding conservation and preventive effort. Another critique of the development is its distribution that is concentrated on the southern part of Bali, which creates unequal social-economic development in the province.

There are several specific environmental issues in Bali that are related to land-sea connectivity and relevant to the planning of both TSP and MSP. Some of these are directly or indirectly related to the development and spatial utilization of the land area. First is the issue of erosion (or abrasion) on the coastal region (characterized by landward impact from the sea). According to the statistics, 64% of the coast in Bali is vulnerable to erosion that is caused by a combination of natural and man-made processes. Second, the saltwater intrusion that has been affecting the aquifers (characterized by landward impact from the sea). Excessive groundwater extraction and sea level rise have caused vulnerability of the freshwater aquifers from saltwater intrusion. Several efforts by NGO (such as IDEP with Bali Water Protection program) have been done to limit the impact. However, the limitation of the public water system and inability to spatially control the development made this problem a growing pain in the province. Third, downstream sedimentation and trash from land (characterized by seaward impact from the land). Land use change, household, and industrial waste have increased pollutions in Bali which in turn affected tourism and marine ecosystem. Some of these problems have been addressed with spatial planning and countermeasure programs. One of the examples is erosion, where efforts have been made by the provincial and national government to address this with the construction of groins, breakwaters, and beach nourishment. However, many of these issues are addressed in an ad-hoc

manner and planning only made with consideration of the impacted realm without consideration of neighboring realm (or superficial consideration) despite the importance of land-sea interaction. Some examples of these can be seen in the proposed Benoa Bay project, which is a reclamation development in southern Bali with severe impact on the mangrove ecosystem. Another example would be the controversial Celukan Bawang power plant in northern Bali, where the new coast side coal power plant has been causing environmental degradation of the coral reef ecosystem, not to mention of its socio-economic impact. Deforestation that is caused by the development also affected the coastal ecosystem negatively, which is a case in Karangasem MPA project that I worked on with Conservation International (CI) Indonesia in Bali.

4.1.2 Actors (A) and Governance System (GS)

- Indonesia (Policy and Regulation)

The TSP zoning affects all population (A1) in the province since it regulates the spatial allocation of all terrestrial space within the provincial administrative boundary. On the other hand, the MSP mainly affects the ocean-dependent coastal population and industries. Thus, the group size of actors that are directly affected by the TSP is larger than MSP. Actors that are involved in the development of both plans are national and regional government institutions, neighboring provinces and lower-level government representatives, NGOs, local community organization, academics, and industry representatives.

At the national level, the President and the People's Representative Council/Congress (DPR) are responsible for setting the broad policy and passing the laws for spatial planning of both land and sea, which establish the constitutional-choice rules of spatial planning (GS1). The most seminal laws passed are the Spatial Planning Law (Law No. 26 Year 2007) and Coastal and Small

Islands Management Law (Law No. 27 Year 2007), which became the basis of TSP and MSP. The Ministry of Agrarian and Spatial Planning/National Land Agency (ATR-BPN) is authorized to develop the guideline and procedure for planning the TSP, which is mirrored by the Ministry of Maritime Affairs and Fisheries (KKP) for the MSP. These two ministries are also tasked with assisting the local government in developing the plan, even though they do not have much influence in the outcome now, by advising and guiding them to follow the correct procedure, except for certain strategic regions that fall under the jurisdiction of the national government. The role of Ministry of Home Affairs (Kemendagri) is also critical in guiding the regional governments in procedural and legal matters, including the approval for the final plan registry (before the spatial plans can be enacted, they require the approval of, and regional regulation number from the ministry.)

At the provincial level, the leadership role (A5) for spatial planning in both realms is given to the governor and the regional secretary (*Sekda*) as the deputy to organize the provincial departments and agencies. The role of developing the TSP is given to the provincial department that is most relevant to spatial planning, which usually falls under the jurisdiction of Public Works (PUPR) or Agrarian & Spatial Planning (ATR) Department (the nomenclature may vary across provinces). On the other hand, the lead agency for MSP development is given to the Maritime Affairs and Fisheries Department (DKP). Historically, the leading roles for planning both the MSP and TSP were given to the Regional Development Planning (Bappeda) agency, a coordinating body that is tasked to harmonize sectoral agencies' effort and interests to achieve regional development goals. However, their role in spatial planning is now limited since that role is given to technical agencies that are considered most relevant to its territorial jurisdiction. Another agency that is influential in the planning process is the Environmental (and Forestry, sometimes)

department, which is responsible for developing the Strategic Environmental Assessment (SEA) for both plans.

Besides the head of provincial government and leading departments, other provincial agencies (such as transportation and tourism departments) are also involved in the planning process as part of the technical team or regional spatial planning coordination team (TKPRD). The latter is an ad-hoc body that is composed of representatives of provincial government departments and agencies that is tasked to integrate spatial planning interests across sectors, regions, and stakeholders (Table 9 below shows the composition of TKPRD). However, this cross-regional integration is meant to be an integration of interests between two or more neighboring provinces instead of cross-realm integration. Still, they are supposedly required to discuss and harmonize the MSP that is directly adjacent to coastal TSP (specifically, within the sub-district administrative boundary), making sure the boundaries match each other, as well as connecting features that share location in the two realms (such as a port).

Position	Institution
Person in Charge	Governor
Chair	Regional Secretary
Vice-Chair	Head of Bappeda
Secretary	Head of the department in charge of Spatial Planning
Team Member	Regional government bodies that are relevant to spatial planning according to the need of the province

Table 9. Regional Spatial Planning Coordinating Team (TKPRD) members

The lower-level regional government (city and regency) is also represented in the development of provincial TSP, and they are required to develop their own detailed TSP based on the provincial TSP plan. On the other hand, MSP is not required at the city and regency level anymore after the Regional Governance Law (Law No. 23 Year 2014) was passed, which transferred the sea jurisdiction of city and regency to its provincial government. This change

happened because the central government viewed that the mayors and regents were not able to effectively control natural-resource-related corruption (which often related to spatial management in coastal waters). However, the local governments have a crucial role in the monitoring and licensing of spatial utilization in both land and sea.

Non-governmental governance (S4) at local and community level is vital, especially with regards to customary land/forest management and co-management of marine protected areas (common pool resources). Depending on the communities and cultural setting, local governance could develop their monitoring and sanctioning system that may be acknowledged by the formal government.

Governance of spatial planning (GS3) is mostly a top-down initiative from the national level. However, it is also influenced by the bottom-up approach. Some of the local/regional actors that may be involved in the planning process are NGOs, customary or local community representatives, business/industry representatives, professional consultants, and academics (mostly university research groups). The TSP regulation gave a specific list of external (non-governmental) parties that may be involved in the planning team (mostly experts in certain fields). On the other hand, MSP regulation gave the local government more freedom to invite external parties and a greater role in the planning process. For example, NGOs could be considered as a funding source. Table 10 below summarizes the major actors' role in spatial planning.

Institution	TSP (RTRW)	MSP (RZWP3K)
<i>National Government</i>		
1. President	Set broad national policy; creates and appoints ministries in charge of spatial planning; develops law with the Congress.	
2. Congress (DPR)	Create and passes law related to spatial planning, local governance, and related sectoral laws.	
3. Ministry of Agrarian and Spatial Planning – National Land Agency (ATR-BPN)	Develop a guideline for TSP; guide regional government in TSP development	Participate in national spatial planning coordinating team
4. Ministry of Maritime Affairs and Fisheries (KKP)	Participate in national spatial planning coordinating team	Develop a guideline for MSP; guide regional government in MSP development; creates a technical executive unit for certain regional monitoring unit
5. Ministry of Internal Affairs (Kemendagri)	Creates policies that regulate regional governance; control regional registry (for regional regulation enactment purpose)	
6. National Development Planning Agency (Bappenas)	Coordinate national development policy and strategy with spatial allocation; ensure the implementation and inclusion of national strategic interest in regional planning.	
7. Ministry of Environment and Forestry (KLHK)	Develop regulation for SEA in spatial planning, manage river basin area and coordinate the policy with TSP	Develop regulation for SEA in spatial planning (recently includes MSP).
8. National Spatial Planning Coordination Team (TKPRN)	The ad-hoc body tasked with coordinating multi-sectoral interests and policies among national ministries and agency.	
<i>Provincial Government</i>		
1. Governor (and Regional Secretary)	Head of the provincial government, leads the development of provincial spatial planning, appoints the spatial plan development team	
2. Provincial Congress (DPRD)	Check the proposed plan and formally enacts the plan as regional regulation	
3. Spatial Planning or Public Works Agency	Lead the technical development of TSP, coordinate the agencies involved in the development	Coordinate the TSP with MSP
4. Maritime and Fisheries Agency (DKP)	Coordinate the MSP with TSP	Lead the technical development of MSP, coordinate the agencies involved in the development

5. Regional Development Planning Agency (BAPPEDA)	Coordinate the regional development plan (RPJMD) into the spatial plans
6. Environmental and Forestry Agency	Develop the Strategic Environmental Assessment for both plans (separately)
7. Regional Spatial Planning Coordination Team (TKPRD)	The ad-hoc body tasked with coordinating multi-sectoral interests among regional agencies. More involved in TSP development.

Local Government

1. Mayor/Regent	Lead the development of detailed TSP within its jurisdiction	Involved in marine monitoring programs and policies
2. Spatial Planning or Public Works Agency	Lead the technical development of TSP, coordinate the agencies involved in the development	Coordinate the local TSP with MSP

Public Participants

1. NGOs	Provides information and public aspiration; initiate conservation development; facilitate discussion; provide fund/resources	
2. Customary/Local Group	Involved in public consultation for inputs and comments; important in monitoring process	Involved in public consultation for inputs and comments; important in monitoring process, especially in co-management of MPAs
3. Business/Industry	Provides information and aspiration; lobbying group for sectoral interest	
4. Academic	Provides information; technical knowledge transfer	
5. Private Consultants	May be employed as a contractor to develop the plan on behalf of the agencies	

Table 10. Role of actors in spatial planning

As can be seen, constitutional-choice rules (GS7) fall within the jurisdiction of the national government that establishes the national laws and executive regulations. This type of rules is more difficult to change since it requires political will from the relevant national government actors (mostly the legislature, executives, and ministries in charge of spatial planning). In this level of rules, no specific regulation requires land-sea integrative policy or approach in planning, except for spatial ‘match’ at the interface of land and sea.

With regards to the collective-choice rules (GS6), there are national, provincial, and local actors that are involved in shaping the strategic plan, spatial allocation, and management plan (as well as the regional development plan, as the prerequisite of the spatial plan). Development of these plans is governed by the guidelines and procedures, which involves checks and balances system that will be discussed more in the following interaction subsection. Finally, regarding the operational-choice rules, actors (at the local level) are constrained by the spatial plan and its management plan (which includes monitoring program and sanction regulation).

While monitoring (GS8) is mainly the role of provincial and local governments, the public is encouraged and expected to participate. Public involvement is essential for complaint filing that may be processed by law enforcers or investigative agents from the relevant agency. National law (within each spatial planning law) regulates formal sanctions for both plans’ violation. However, the provincial government is required to create the monitoring and evaluation program accordingly within each spatial plan document.

Another significant distinction between the two planning realms is the property right (GS4) regime between the two. In the constitution, land, water, and the air is owned by the state and needs to be utilized for the welfare of the people. This is the basis for the state’s agrarian and spatial planning regulatory system. In practice, the citizen of Indonesia can own land through a

property right system that is protected by law, with a certificate issued by the government. This real property of land (and building) is tradable and leasable in the regulated market. On the other hand, nobody could own sea space except for the state. Spatial utilization is given through location permits (for activities that take place within a certain sea space) and management licenses (for extractive activities). Unlike the land counterpart, these sea-based property rights are not tradable. The government does try to pursue a more integrative approach in the spatial-based licensing system in what is called Online Single Submission (OSS) system, where the application for both permits is now integrated. However, this push toward integration was designed to create a more business-friendly system instead of any ecological concern.

- Bali (in Practice)

Formal spatial planning for both land and sea in Bali strictly follows the regulation. Thus, the actors that are involved are appointed or invited according to the rules and procedures. The former Governor, I Made Mangku Pastika (in office from 2008-2018), was in charge for the development of the teams for both 2009-2029 TSP in 2008 and the MSP work that began in 2013. Next to the governor, the regional secretary of Bali holds the most influential position in the provincial government to manage the provincial agencies and departments on a day-to-day basis, even though he does not have the authority to appoint members of the planning team.

Although the TSP was developed by a different team in 2008 (due to change in regulation), the composition of institutions that made up the planning team is similar since both used the Regional Spatial Planning Coordination Team (TKPRD) as the basis for the planning team. The current TSP revision development team is composed of the governor as advisor; regional secretary as chair; heads of BAPPEDA, legal bureau of the Province, and public works department as co-vice chairs; division heads of BAPPEDA and public works department as secretary. The team

member also includes several other provincial government institution representatives and professional that are mostly from the academics (see Appendix X. for full team member). Based on the latest regulation, the governor created the planning team for MSP in 2017 with the regional secretary as an advisor; head of provincial DKP as chair; head of BAPPEDA as secretary; and other relevant government agencies (as well as lower level government representatives) as a team member. Outside the government officials, the team also composed of NGOs, traditional/religious authority representatives, industry representatives, and university academics (see Appendix X. for full team member), as well as private consultants that were outsourced to work on the document.

Arguably, in Bali, the DKP and PUPR are the government institutions that are most influential and directly related to spatial planning (especially since all of them have a division that is specifically tasked to coordinate or develop the spatial plan). Although BAPPEDA has a considerable position in the development of both spatial plans, they are not involved much in the process anymore due to change in regulation that put more authority in “technical” institutions instead of the “coordinating” body. Other than those three, there are at least three other departments that are influential in the development of both spatial plans in Bali. Environmental Department plays an important role in both since they are responsible for developing the strategic environmental assessment (SEA) for both plans, separately, which is a mandatory requirement that must be fulfilled before the plans can be enacted as a legal document. Transportation, Information, and Communication Department also involved in shaping the node and network of transportation on land and sea, which is also influenced by the national policies from the Ministry of Transportation. Finally, the Tourism Department represents major stakeholders and strategic provincial and national interests, especially with regards to tourism destination management.

Outside the government circle, NGO actors also play an important role in initiating environmental conservation effort as well as bridging the communities with government policy development. Out of many environmental NGOs that are working in Bali, two are closely involved in spatial planning (especially with MSP), they are Conservation International (CI) Indonesia and Coral Triangle Center (CTC). CI has a wide variety of conservation portfolio around the island, but some of their most important spatial work is the development of MPA networks in Bali, participatory mapping project in villages, and promoting the “*nyegara gunung*” principle. The last is a ridge-to-reef conservation effort that is based on the re-interpretation of local tradition and ceremony that respects the relationship and interconnectivity of the environment from the mountain towards the sea. On the other hand, CTC plays a similar role in conservation effort although their interest is geographically more specific within the Nusa Penida MPA.

Academics representative from Udayana and Warmadewa University provide data, and technical expertise, especially in physical and oceanographic modeling. As mentioned, relative to the other provinces, Bali has a unique socio-cultural setting due to its tradition and religion (Hindu majority) that shapes the society and daily practices. Local religious leader and village heads are also still respected and influential, especially since the formal government acknowledges the traditional form of leadership and governance. In the spatial planning process, representatives from religious and traditional village authorities also represent the general public interest to a certain extent. Although some interviewees pointed out their lack of interest and expertise in technical matter of planning process, traditional and religious authority representatives have a significant role due to the influence of “*awig-awig*” (traditional law/custom) of traditional communities and “*bhisama*” of Hindu religious authority in Bali. One of the most important regulations that are

applicable is the “holy zone,” which strictly limits the utilization of space around a certain radius from a temple (the radius varies according to the hierarchy of temple).

In comparison, many provincial and national government institutions are involved in both planning realms. The head of the provinces (Governor and Sekda) always represented although they take up a different position in both planning team. Similarly, the leading technical institutions that are responsible for TSP and MSP are taking either coordinating role as the chair (for MSP) or vice-chair (for TSP). The role of Bappeda is diminished now, although they still have more position and role in TSP compared to MSP. Table 11 below shows the comparison of institutions participating in both TSP and MSP as well as their position in the formal structure of spatial planning.

Outside the leadership structure, the membership of the team varies on both the government institutions they represent and the non-government institutions that are invited. For TSP, the member of government and non-government institutions that participate in the team followed the regulation that already outlined the agencies that are part of the TKPRD as well as the recommended expertise that could be invited to participate, which is why most of the participants are academics from local universities. On the other hand, MSP outlines a broader set of government institutions that also includes marine-specific sector agencies such as the Navy (*TNI-AL*) and Water Police (*Polair*), as well as the coastal reGENCY/city representatives from relevant departments. Non-governmental institutions are invited after stakeholder mapping process to highlight institutions that could contribute with regards to on-the-ground knowledge, representation, and technical capacity.

Position	TSP	MSP
Director	-	Governor
Advisor	Governor and Vice Governor	Regional Secretary
Chair	Regional Secretary	Head of DKP
Vice-Chair(s)	Heads of Bappeda, PUPR, and Law & Human Rights Bureau	-
Secretary	Division Heads from Bappeda and PUPR	Head of Bappeda
Government Institutions	Nine provincial government institutions	33 government institutions, including the coastal regency/city representatives
Non-Government Institutions	12 invited professional and experts that are mostly from academics	Seven invited representatives from NGO, industry, academic, and traditional community

Table 11. Comparison of actors and position in spatial planning teams

4.1.3 Related Social, Economic, and Political Setting (S) & Ecosystems (ECO)

- Indonesia (Policy and Regulation)

One significant difference between the land and sea spatial resource that is tightly related to their property regime is their relationship with the market (S5). Although the resources extracted or produced within both spaces are tradeable in the market, the right to sea space utilization is not freely tradeable in the market, unlike the land (and buildings), which is tradable in the open, regulated market.

Technological advancement (S7) in spatial planning such as GIS and remote sensing have been driving the improvement of spatial planning development in both realms. This also helps in bridging participatory planning and public information dissemination through the online-based spatial database for both realms. However, the application for monitoring as well as data collection for MSP is still very limited in comparison to TSP due to the difficulty in accessing the space and technological limitations in the extraction of various marine biophysical and oceanographic data.

The climate pattern (ECO1) in the land is characterized by more variation across the provinces due to variation in topography and latitude. On the other hand, the climate pattern in the

coastal zone is more homogeneous. The pollution pattern (ECO2), along with flows into and out of focal SES (ECO3), is more of a concern in MSP due to its fluid and dynamic biophysical characteristic (such as cetacean migration patterns and sea currents), which is one of the required considerations in spatial planning.

- Bali (in Practice)

Economically, in terms of GDP, Bali produced about Rp. 215 trillion (approximately \$15.4 billion in January 2019 rate) in 2017, a 1.56% contribution to national GDP, which is growing at 5.9% (domestic GDP growth is measured at 5.1%). Per capita regional GDP in Bali is estimated at Rp. 50.7 million in 2017, which is slightly less than national GDP at Rp. 51.9. However, this number is relatively high due to the lack of oil and gas mining contribution to the economy in Bali. Tertiary (service and related) sector dominates the economy at around 67%, followed by the primary sector (agriculture) at 17% and secondary (manufacture) at 16%. This ratio is considered undesirable due to its overdependence on the tertiary sector (tourism), and the government is working to shift the ratio toward 20%:25%:55% for primary, secondary, and tertiary sector, respectively.

Technologically, spatial planning in Bali has employed spatial technology (GIS) as required by the regulation. However, it is still mainly used by external consultant since the local government capacity is very limited (especially in DKP). More advanced application of GIS, such as the use of decision support system (e.g., Marxan) is not used since the procedure does not necessitate it and again, human resource capacity is still an issue. Thus, the spatial allocation process relies more on a suitability analysis (using parameters that have already been predetermined by the guideline) for an arbitrary unit of area (that is determined through various processes) instead of a holistic optimization process. Availability of data and instruments for data

collection (especially for MSP) hampered the efficacy and quality of the planning process. However, budget limitation restricts the ability of government and consultant to gather more data. Use of a public spatial database to promote participatory planning was a discourse that did not materialize in Bali (at least on time, for the current TSP and MSP development). NGOs such as CI aspire to develop an island-wide public spatial database (such as SeaSketch that was used by WWF in a neighboring province).

Climate pattern (temperature and rainfall rate) varies mildly according to the elevation and season. The average temperature recorded in 2015 was 26.8° C which has been increasing (recorded temperature in 2011 was 25.4° C) and decreases as the elevation rise. Seawater temperature ranges from around 27-30° C with a distinct distribution of warmer temperature on the northern region relative to the southern part of the province. Average annual precipitation measured at 1420mm in 2015, which is relatively lower on the national scale (but still high compared to global precipitation rate at 990mm).

Pollution pattern is an important consideration especially concerning point, and non-point pollutions (including trash) originated from the land. It is estimated that 80% of the trash on the sea came from the land (mostly plastic). Although it is not being addressed systematically in spatial planning, management of household and industrial trash is a growing concern. Public and media are more aware and scrutinize this issue critically, such as when a foreign tourist posted a viral video of underwater plastic waste in a popular dive site in 2018 (Lamb 2018). Sedimentation of chemical, organic, and suspended solid is also considered in spatial planning according to environmental quality standards for analysis of spatial allocation. However, it mainly takes into account the near-shore and estuary region only.

4.1.4 Interactions (I)

- Indonesia (Policy and Regulation)

The previous first-tier variables interact in real-life action situations that will determine the social-ecological outcomes of spatial planning. However, since the MSP is a recent development that has not been fully implemented and evaluated, there is no sufficient data to illustrate and compare how all the SES Framework variables interact and whether they managed to achieve the desired outcome. Thus, I will focus more on the interaction of the Actors and Governance System within the planning process and how the cross-realm issues are being addressed.

The planning procedure for both TSP and MSP is designed to take a similar course that can be broadly divided into six steps. First, the provincial government needs to establish a team that will be responsible for developing the plan. Then, the team is tasked to gather data (spatial and non-spatial) and analyze them. With these data as a basis, they are to draft the spatial allocation along with the management programs, which will need to be presented to the public in a public consultation meeting. If the local stakeholders accept the plan, it can be developed into a regional regulation draft, which involves national government approval. Finally, the provincial legislative can pass the plan as a regional regulation. Although they are similar in principle, there are several differences between the steps and public participation process. Table 12 below summarizes the planning process of both realms (along with the public participation comparison).

One difference in the development process is the role of the national ministry in ‘technical consultation’ for MSP development to guide the regional agency for this new task. There is very little involvement of the ministry in TSP development in comparison to MSP. Another difference is more public consultations and involvement that are required for TSP planning in comparison to MSP. In fact, there is no public involvement in MSP development after the draft has passed the

final consultation process. According to the regulation, the final document is not required to be presented in public consultation. However, there is still a procedure for the national ministries to check the substantive draft, and the provincial legislative body holds the right to approve the plan.

The regulations do not prescribe any concrete method for synchronizing the two plans. According to Yusuf Eko Buditomo, an official from the Ministry of Maritime Affairs and Fisheries, the ministry asked the provincial government bodies in charge of planning the MSP and TSP to meet, discuss, and agree on the proposed draft on the basis of the spatial allocation, which will need to be documented in a joint statement. However, the procedure is only required for MSP development, and there is currently no standard to evaluate the synchronization of the two plans.

The deliberation process (I3) in planning is an important consideration. One of the principles in the deliberation process for both TSP and MSP is “*musyawarah untuk mencapai mufakat*” which can be loosely translated to “dialogue to reach consensus.” As a consequence, there is no voting mechanism to reach an agreement since the principle is applied to avoid majority and minority groups. Deliberation processes happen during technical meetings, workshops, seminars, FGD, and public consultations (for both TSP and MSP) at national, provincial, and local levels. Arguably, one of the most important steps are the public consultations that are required by law to be conducted at least twice for both plans.

Conflict (I4) of planning and utilization are different between the two realms. Due to the definitive property rights and alienability of land space, the conflict on the land is less than the sea, which is further problematized by other issues such as difficulty in monitoring and externalities that are more prevalent due to its physical characteristics. The laws regulate resolution for conflict in spatial utilization. Ideally, they should be settled out of court in a ‘familial’ (*kekeluargaan*) manner or arbitrated within (or outside) the court.

Planning Steps	TSP (RTRW) <i>Permen ATR Number. 1 Year 2018</i>	PC	MSP (RZWP3K) <i>Permen KP Number. 23 Year 2016</i>
1. Preparation	Provincial government creates a developing group (members are regulated). Secondary data assessment, review of the previous plan. Public announcement.	x	Governor appoints agencies, creates a working group (members are not regulated).
2. Data and Information Gathering	Collection of primary and secondary data (basic and thematic maps).	x x	Collection of primary and secondary data (basic and thematic maps). Technical consultation of basic and thematic maps to the ministry.
3. Data Analysis	Data processing and analysis.	X	Creation of 'initial document' that contains analysis and strategy. Technical consultation of 'initial document' with the ministry. Public consultation of the 'initial document.'
4. Conceptual Drafting	Conceptual drafting of the policy and strategy. Spatial plan sketch. Spatial structure, pattern, and national strategic zone proposal developed using guideline.	2X X	'Interim document' development that contains suitability analysis and spatial allocation proposal. Technical consultation of the 'interim document' with the ministry. Public consultation of the 'interim document.'
5. Regional Regulation Development	Academic text on regional regulation of TSP. Spatial plan 'translated' and drafted into regional regulation.	x	Final document development. Ministerial input. Spatial plan 'translated' and drafted into regional regulation.
6. Finalization	Regional regulation enacted		Regional regulation enacted

Table 12. Provincial spatial planning development procedures (PC: Public Consultation, x: may be required but limited, X: required by law)

- *Bali (in Practice)*

To briefly recap: TSP for Bali was developed in 2009 and currently under revision, which was, kick-started in 2016. On the other hand, initial work on MSP began in 2013 but stalled and re-activated in 2017 until now. Based on the findings, TSP development largely went smoothly due to the experience the institutions involved have over the development. However, there are still issues behind the plans, especially with land use compliance and associated environmental impact. MSP development was considered to be more challenging due to technical difficulties and limitation of institutional capacity in sea planning. There has been limited effort to integrate planning on both realms, although most efforts could be credited to NGOs since the bureaucracies are more likely to strictly follow the outlined procedure.

The provincial government, especially the associated sectoral institutions in charge of spatial planning, are viewed as the main actors and contributor for both MSP and TSP. However, the role of the leaders, especially then Governor and regional secretary, have been considered underwhelming. Several respondents noted that the governor and even the regional secretary have never shown up for any MSP meeting. Some also questioned his seriousness since the budget given for planning was very low compared to the estimated cost. However, Made Sudarsana, the division head at the provincial Maritime and Fisheries Department said that

“Despite the provincial government negative budget, we have worked with the regional secretary that understand the importance of the MSP and approved the budget, even though it is less than what was asked.”

The ministerial staff reportedly visited the governor once to brief and advise on the importance of spatial planning for the province, but their participation still leaves something to be desired. Arguably, there are many other issues that they have to address and spatial planning could be considered as less important, especially since the planning program happening at the end of his term. As Ngakan Kirim said,

“[Stakeholder] interests in the sea is smaller than the land. Institutions involved mostly related to fisheries, transportation, and tourism.”

The newly elected governor, I Wayan Koster, promoted the principle of “one island, one plan, one management” for tourism and development in Bali, but it is still not clear how it is going to be implemented in spatial planning and if it is related to integration between TSP and MSP.

In practice, the Maritime and Fisheries Department, as well as the Public Works and Spatial Planning Department (PUPR), are the main leaders behind the development of MSP and TSP, respectively. Initiative for coordinating action and technical planning meeting is planned at their discretion. Development of the actual spatial allocations is done with the help of consultants. PUPR is viewed as being capable of handling TSP since they have experience from past development. Even though their spatial planning section and role are new, their personnel came from Bappeda’s former spatial planning unit that was transferred to PUPR since the new regulation was enacted. Conversely, DKP staff seems to be sailing in uncharted water, due to the novelty of the project for the institution and limited human resource capacity they possess for handling technical matters (such as GIS and mapping). The regional budget seems to be one major issue that leads to the underperformance of MSP development. Nengah Suadana, the Section Chief for Spatial Planning and Community Empowerment at DKP admitted that

“To plan the sea space...I just realized that the theories that were stated are true. It requires substantial funding. In 2016, we could not work on the project because there was no budget. Only in 2017, we were able to start working. Also, in terms of human resource, the department does not have any staff with expertise in mapping.”

Permana Yudiarso, Section Chief for Program and Evaluation at the Coastal and Marine Resource Management Agency (BPSPL) suggest that

“DKP should open up with their limitation so that stakeholders that are willing to be involved but hampered by regulation could help.”

Several respondents also commented on DKP's ability to coordinate across sectors, which is a role that is considered to be more suitable for coordinating agency such as Bappeda.

Most non-government (and several governments) actors considered the contribution of other government institutions rather lackluster. In general, other than DKP and PUPR, other sectoral institutions did not participate maximally. Several respondents highlighted the fact that the head of agencies that are involved in spatial planning delegated their responsibility to their subordinate, which often sent another person to represent the institution on their behalf. Sometimes, the person that get sent is too far down of the chain of command that they were not able to make any decision or significant contribution. Respondents also mentioned the general lack of understanding or sense of urgency, especially in MSP development. Integration of TSP and MSP or even land-sea interactions never seem to be a consideration for these institutions. For example, the Tourism Department delegated different section heads for TSP and MSP. Ida Ayu Indah, the section head for Tourism Industry as the department's representative for MSP, said

“our section is not involved in TSP at all. We have another section of Destination Development that is involved in TSP because that was what the department head decided.”

When being questioned about any effort of knowledge transfer within the department, she admitted that there was no effort in coordination between the two sections internally since they feel that it is more of the responsibility of the technical institutions (DKP and PUPR). Other institution such as Bappeda has very little contribution to the planning process, as I Made Sudiarsa said

“Since the new regulation regarding the local governance, our role in spatial planning is very little. Perhaps almost no role at all. Because our role is just to support now.”

Several respondents also commented on TKPRD, the ad-hoc coordinating team, in Bali to have no influence in planning and even in coordinating the two plans. Environmental Department (DLH), which is responsible for developing the SEA for both plans, is not free from criticism due to its

effort that is perceived as only a formality by I Made Iwan Dewantama, the Bali manager for Conservation International (CI) Indonesia. There has been no conscious effort in analysis of cross-realm environmental impact in both SEA as they target spatially specific policy impact. As Abd Rahman As-Syakur, a researcher at the Udayana University working with the River Basin Management Agency (BPDAS),

“River basin plan is tightly related to TSP as one will be the basis for development for another since both need to produce SEA. However, we did not analyze the downstream impact of development. We considered erosion and sedimentation impact, but more for the reforestation effort.”

As such, many waste generation and sedimentation caused by land use/cover change that travels downstream did not get captured in MSP and TSP SEA evaluation or done separately.

The performance and contribution of non-governmental institutions that are directly involved in spatial planning vary. Academics play important technical role in scientific advisory and data collection/provision. Although the universities involved in both MSP and TSP are the same, the actors participating in the teams are different. MSP involves academics with expertise in marine science, while TSP academic participants vary from legal, planning, engineering, architecture, and social science background. They have a more in-depth understanding and concern for land-sea interactions, especially on matters such as sedimentation from the catchment area and point source pollution from textile industries. However, I Made Iwan Dewantama viewed the role of academics as rather technocratic and out of touch with community needs (ivory tower). Environmental NGOs such as CTC and CI play an important role not only in promoting conservation but also in bridging communities with bureaucrats and policymakers. They often facilitate discussion and workshop related to spatial planning in support of conservation development. Like the academics, their interest is also rooted in a better understanding of the ecological connection between the land and sea such that they work on cross realm spatial

planning. CI, for example, has been working on MPA development in Karangasem using ridge-to-reef principle. I was involved in their research of reforestation effort and its impact on coral reef sedimentation 7 miles downstream, using catchment area modeling analysis.

Unfortunately, I could not manage to interview representatives of other institutions from industry and traditional community representatives. Most of them declined the request since they feel that spatial planning is a technical subject that is beyond their authority to answer and all suggested me to contact the DKP or PUPR departments directly. Several respondents expressed the lack of engagement from the representatives of the religious/traditional community. Based on the information that I have gathered, it seems that the industries' representatives are more interested in their specific sectoral concern (such as tourism or fisheries). On the other hand, the publics are mostly still unaware of the spatial planning of both regimes, especially the MSP. Thus, they are not very concerned or interested, since there seems to be an expectation that the government will handle this matter themselves. The traditional and religious authority representatives appear to be more concerned toward the conservation of culture and tradition within their domain. For example, in one of the workshops for MoU signing of MPA development that I attended, several village chiefs expressed their concern that MPA will diminish their authority through the encroachment of provincial (or national) government power in their communities. Similarly, in TSP development, they were vocal on development issues related to traditional/religious matter such as holy zone restriction and building height control (in Bali, the maximum building height is 15 meters, which is based on the height of coconut tree). Thus, they are not particularly interested or outspoken on environmental issues, especially on land-sea interaction. On the other hand, there are some mixed opinions with regards to industry representatives, which only represented by fisheries and marine tourism association. Most

government officials agreed that they are quite representative and the relevant government institutions sufficiently represent other sectors interest. However, I Gede Hendrawan, a lecturer from Udayana University who is a member of MSP development team also questioned the role of institutions involved and felt that they had not done their job in communicating and absorbing the aspirations of their sectoral stakeholders. Judging from their perceived contribution in MSP development, they carry specific sectoral point of view and interest toward greater economic development but not a visible indication of understanding or concern on land-sea ecological matters.

The general public participation at large in spatial planning can be considered weak. This is an issue that is voiced by many respondents, including government official. As mentioned above, several government officials think that the current actors are representing sufficiently. However, they did admit that greater participation is desirable, although they struggled to balance the capacity for participation with the limited resource that they have. To summarize, there are mainly two problems with the contribution of the representatives: the institutions did not absorb the aspiration sufficiently, and they do not understand the spatial planning issues enough to contribute. Yusuf Eko Buditomo, an official from the Ministry of Maritime Affairs and Fisheries, observed that the social class structure (caste) in Bali might have been an issue that made the participants hesitate in questioning the authority. Research on media coverage returned many news coverages on TSP development, especially since the newly elected Governor took up the office in September 2018. On the other hand, MSP development rarely gets coverage in the news, except for activities that are related to the proposed Benoa Bay reclamation project. Other than reactions to large-scale (potentially disruptive) projects or development, there is not much bottom-up public pressure on spatial planning, such as the aforementioned reclamation project and the controversial Celukan

Bawang coal-fired power plant. Land-sea socio-ecological issues, such as sedimentation and saltwater intrusion problems, only arise to the surface with the help of NGOs that helped to raise awareness. Although anthropogenic on land-sea ecosystem mainly happened from public activities, it is lamentable that their understanding and participation in spatial planning is limited. Hanggar Prasetio, a staff at Conservation International, said, “we need to promote local champion and leaders that understand the issues on the ground and can help organize their community to take up action on these (environmental) issues.”

Overall, the interaction among the actors in the development of both MSP and TSP is going well as there is no conflict of interests that are not able to be resolved. According to I Made Sudarsana,

“So far there has been no conflict of interest. Stakeholders are very cooperative, and we could resolve any differences we had during the meetings.”

In terms of land-sea integration, the procedure for harmonization between the two plans has not occurred yet. However, it could be predicted that there will not be a significant issue between the two plans (in terms of the procedural harmonization) since the “harmony” that is envisioned by the provincial government and the regulation is somewhat superficial. As Made Arca, the consultant that is tasked with developing the MSP,

“Integration between the two plans means that the coastline boundary should match, the ports on the landward and seaward side must connect, along with the transportation network. This is what will need to be harmonized between the two.”

There are mixed opinions on the current level of integration between the two plans. A greater effort toward integration is not really an objective of most provincial bureaucracies that strictly follow the national regulation and procedures. On the other hand, NGOs, academics, and some bureaucrats felt that it would be more beneficial to plan the two realms together since Bali is an island ecosystem that needs to be viewed holistically. However, most noted the regulatory gap

between the two planning regimes as well as what is infamously known as “sectoral ego,” that could be described as “tribalism,” in Indonesian public service between two leading departments that are in charge of spatial planning. Thus, the role of the national government in synchronizing regulation of both TSP and MSP is imperative.

4.1.5 Outcomes (O)

- Indonesia (Policy and Regulation)

Both TSP and MSP need to be developed according to the regional medium-term development plan (RPJMD) that includes various social, economic, and cultural targets (O1). Each plan develops its own indicators that are directly or, more often, indirectly related to social performance, since the TSP and MSP mostly outline the physical indicators such as road or port development programs and targets.

On the other hand, the ecological performance (O2) is captured more concretely through specific targets such as areas to be conserved according to the regional development plan as well as the strategic environmental assessment (SEA) report. However, the SEAs for TSP and MSP are developed separately by the provincial environmental and forestry agency. At the moment, there is no land-sea interaction impact analysis that is required to be performed for both SEA reports.

Within the terrestrial setting, the TSP’s SEA requires coordination with the catchment area planning, which captures the externalities (O3) considerations from land use change or point/non-point source pollution towards the riparian zone. On the other hand, the river basin planning is not related to MSP at all. MSP does consider the land-sea ecosystem from the sea to the landward extent of sub-district (*kecamatan*) administrative boundary, especially with regards to pollutants such as biological oxygen demand (BOD) and total suspended solids (TSS).

- *Bali (in Practice)*

Since the plans (both the MSP and TSP revision) are still in development, I am not able to evaluate the spatial allocation and its socio-ecological impact. Almost all respondents voiced optimism in the ability of both TSP and MSP in controlling development in Bali. Heads of planning section in PUPR and DKP opined that since the planning process has followed the proper procedure, the resulting regional regulation would become a strong basis for development control. However, both admit that achieving the socio-ecological objectives will be contingent on the performance of monitoring and enforcement agencies. Some expressed their optimism with doubt like I Made Iwan Dewantama expressed

“I tried to be optimistic about the outcome. However, it is quite difficult if we look back. In the future, there is a tendency for greater sea space utilization. For example, sand mining in south Bali. There should have been research about sand mining on the sea since they are very close to the land.”

Land-sea related issues such as erosion and abrasion are being addressed and accommodated in spatial planning through proposed coastal engineering measure (seawall construction). Although there is no spatial strategy, the issue with saltwater intrusion is proposed to be addressed with a regulatory measure, especially with groundwater extraction permitting system. However, there is still many gaps in public water provision and monitoring problem for small-scale (household) water extraction, which leave the impact on this strategy questionable. There are organizations that are working to address this issue specifically, such as the IDEP Foundation that is working on water protection programs (through the construction of open wells) in 13 critical areas in the province. Lastly, land-based waste and sedimentation problem is being addressed through the proposal for waste processing facility and monitoring of industrial/household waste dumping. However, there is no systematic spatial analysis for land use or land cover change, which have been going through significant alteration in the past decade. Although the catchment area plan and

TSP make some analysis on basin sedimentation, they do not cover the downstream impact on the marine ecosystem. Thus, rendering the analysis and planning of the two realms detached.

In broad summary, spatial planning in Indonesia can be understood as a spatial-based management system (GS7) that is imposed by the national government (GS1, GS3) on the provincial and local government (with public participation) (A1, A5) for development of spatial allocation and programs (GS6, GS5). The purpose of spatial planning is to manage spatial utilization and various resources' extraction on land and sea. Spatial planning consideration of the two realms differs substantially due to their social-ecological characteristics (such as their property rights, sectors involved, and biophysical properties) (RS2, RS4, RU7) and space they occupy (RS1). However, they are connected through natural processes and human activities that make it very important to pay attention to the other realm when planning one (RU3, O3) – especially for the marine ecosystem, due to land-sea asymmetrical influence. Currently, the regulations normatively require the two planning realms to be planned in a “harmonious, compatible, and balanced” manner (GS7) without a clear mechanism in place to ensure this except for a *post-hoc* planning synchronization procedure that brings the two sides of planning authority together to approve the spatial allocation.

4.2 Integration of TSP and MSP in Indonesia

This section will summarize the finding from the three questions that are the basis of this research in Indonesian context:

- How is integration understood or defined by the regulation and actors, or to what extent should the two plans be integrated?

- How integration/harmonization between two plans are being developed with each other in practice relative to theories and regulations? What is the expected outcome?
- What is hindering the development of a more integrated approach in planning TSP and MSP together?

How is Integration Defined?

Integration, or what is more formally called “synchronization” or “harmonization,” is a process that is made to achieve what is normatively called “*selaras, serasi, dan seimbang*” or “harmonious, compatible, and balanced” state between the two plans. However, the regulations have never specified any particular criteria or objectives that need to be achieved to attain this “synchronized” state. The written regulation gives the MSP jurisdiction over spatial planning on the coastal land, to the limit of district administrative boundary to give some measure for integration (though it is not practiced in reality). Most government officials view the harmonious relationship between the two plans as an optimized state where there is minimum conflicting use between the spatial allocation of TSP and MSP on the margin. They also viewed synchronization as proper connections between the two plans where the nodes, lines, and surfaces across the realms connected seamlessly without gaps or overlaps. This point of view is similarly shared by other provincial-level government institutions. Provincial government head and its departments/agencies bureaucrats mostly follow the guidance of the national government or ministries, while accommodating provincial stakeholders’ interest as long as they are still within the corridor of regulation and procedure. In Bali case, local culture and principles such as ridge-to-reef principle have some impact, although limited, in shaping how actors think about the relationship between the spatial planning of land and sea. The consultant who is in charge of developing the actual plans also shares this regulatory and procedural view between the two

planning regimes. Community organizations and the public, in general, have a somewhat neutral view on the two plans although more attention is given to controversial projects that may have a large impact on both realms. While generally TSP and MSP is being viewed as equal, nobody has a strong opinion about how the two should be structured together. On the other hand, NGO and academics are the actors that are most aware of the land-sea relationships that are based on a more profound scientific and cultural understanding of the socio-ecological system, which is more in line with the more integrated perspective of ecosystem-based planning.

How is Integration Pursued?

In practice, both TSP and MSP are developed separately, with what can be considered *post-hoc* synchronization as a measure for harmonization. The Ministry of Internal Affairs develops a policy that requires provincial government to establish the spatial planning coordinating team (TKPRD) that is tasked with synchronizing interests across realms and stakeholders in spatial planning, especially in accordance to the development plan (RPJMD). However, the institution is tailored more toward the development of TSP and does not serve many purposes for MSP development. For the development of MSP, Ministry of Maritime Affairs and Fisheries (KKP) in consultation with other institutions develop a procedure (that is not established in the regulation yet) for harmonization of MSP and TSP. They require the local departments that are in charge of developing MSP and TSP to meet, discuss, and agree on the spatial allocation, a process that needs to be captured in minutes of meeting as a ‘proof’ of harmonization. However, there is no comparable measure on the TSP side. The novelty of MSP, the lack of capacity and limited resources posed enough trouble for the provincial agency developing the MSP, which made it difficult for them to develop a more integrative approach since their load with the current procedure and coordinating responsibility is already deemed too much. As previously mentioned,

the jurisdiction of MSP on the land is not acknowledged in practice since the institutions in charge of TSP disagree with the approach. Thus, the district administrative boundary is only highlighted on the MSP map, without any indication of their spatial allocation. Strategic Environmental Assessment (SEA), especially for MSP, does talk about estuary pollutions but analysis on it did not go beyond the coastal limit. Similarly, SEA for TSP also stopped at the impact on the coastal margin. Although the catchment area plan and TSP are connected, there is a gap in the analysis of river basin downstream impact on the marine side. Outside the formal spatial planning system, NGO such as CI does make an effort to address land-sea interaction issues within the context of MPA development.

What is the Barrier towards Integration?

Multiple barriers prevent greater integration of MSP and TSP in Indonesia from happening. In general, these barriers can be classified into institutional and technical barriers. Institutional barriers of integration are nested at the national, provincial and local level. The current national spatial planning laws (Laws No. 26 Year 2007) made a specific phrasing that separates the two planning regimes: “Sea space and air space, their management is regulated by separate laws” (Article 6.5). Most government respondents recall this regulation as the main barrier to a more integrative land-sea spatial planning, suggesting that no further integration could happen without change to national laws. The regional spatial planning coordinating team (TKPRD) is not performing optimally due to its role that is tailored more for TSP. The ad-hoc organization is set to be led by Bappeda and institution that is in charge of provincial TSP (in Bali case, PUPR). The role of DKP in this organization seems to be minimal, which problematize the organization ability to coordinate MSP or synchronize it to TSP. KKP is aware of this issue, but they were unable to

make a change to its institutional hierarchy due to disagreement from other ministries (mainly Ministry of Internal Affairs/Kemendagri & ATR-BPN). Yusuf Eko Buditomo said

“Last year, during yearly coordination meeting of TKPRD, we have suggested that maritime department be positioned at the same level with their landward counterpart as second vice-chair. However, Kemendagri objected since it is considered unusual, structurally. In practice, this has caused a problem in several provinces, but not all.”

Currently, spatial planning is authorized to “technical” departments that are leading a very specific spatial area and sector (DKP and PUPR) instead of a more neutral “coordinating” agency (Bappeda). Sectoral ego between public institutions seems to be a barrier towards integration since sectoral, technical departments viewed integration as an intrusion of their authority and jurisdiction. Spatially, this is shown by the reluctance of land use planning authority to include the district administrative boundary on the land to be included in MSP. Although the perception of spatial planning as coordination of multi-sectoral activity is prevalent for TSP, MSP is still viewed more as a technical project that is very different from its landward counterpart, which further fueled the division from the seaward side.

Strategic Environmental Assessment (SEA) that is required for both planning regimes did not bridge the difference or cover the land-sea interaction. Even though the catchment area plan is related to TSP, it has no relationship to MSP, and neither does their SEA’s. Government leaders at the provincial level do not seem to have the same level of political willingness and effort in MSP compared to TSP. This view made MSP appears to be secondary to TSP in nature, and as such, the seaward impact of landward development is a consequence that the sea just has to deal with. Integration between plans is then viewed simply as lines, dots, and surfaces that are properly connected on both maps. Most provincial agencies and consultant that are working on the actual plans further share this paradigm. Although TSP underpins the development of MSP (especially sea space that is adjacent to the land), MSP has limited ability to influence the spatial planning

development of the land. In Bali, and most other provinces, the planning of MSP and TSP have been separated temporally, which created a gap of information and decision made between the two. Since the TSP was created beforehand, MSP is obliged to follow suit. MSP could make a recommendation to future TSP revision or development even though there is no guarantee that recommendation that is made in MSP will be implemented in TSP. Although as Krishna Samudra, sub-directorate head of regional zoning at KKP, informed of one example

“In West Papua, during their TSP revision, all recommendation that was made by the MSP was accommodated.”

However, the TSP revision of this particular example was conducted in 2018, together with the development of their MSP (which is not finalized yet, as of January 2019), suggesting a more parallel development of the spatial plan. Although there are organizations such as academics and NGOs that viewed integration more than a superficial connection on the margin, their ability to influence outcome and process is limited by the regulation and planning procedure.

Technically, the socio-ecological difference in land and sea made it difficult to plan as well as manage the land and the sea. The regulations do not provide any standard or measures that could be operationalized to harmonize the two plans. It is then up to the provincial willingness and capacity to harmonize them. However, as in the case of Bali, there is limited willingness and capacity of local government to develop MSP, let alone pursuing greater integration between the two plans. Technically, planning across the realm adds to the complexity due to the addition of variables and objectives that need to be optimized, which often requires the assistance of decision-support system due to the scale of planning. However, the current level of local government human resource capacity is too low for a more progressive approach, since the current procedure is already challenging enough. This is also exacerbated by the insufficiency of data (in terms of quantity and quality) especially for MSP and land-sea related interactions. The fact that funding allocated for

spatial planning development (and data collection) further worsen the capacity and data issue, especially for the MSP that is starting from scratch. Since MSP as a regulatory instrument is a novel concept, there is not much public awareness and pressure to pursue integration or even better planning. This made public participation for both spatial planning (especially MSP at the provincial level) low, which further disincentivizes elected leaders and bureaucrats willing to pursue a more progressive and integrated mode of planning.

Chapter V.

Conclusion and Recommendations

In this chapter, I summarize the findings that I have gathered from the institutional analysis of MSP and TSP from the policies/regulations/guidelines evaluation and the interviews, especially concerning land-sea interaction in spatial planning. Based on these findings, I have made several suggestions that the government (at the national, provincial, and local level) and other actors should take to improve the spatial planning policy in general. These recommendations incorporate land-sea interaction/consideration in the planning process through an institutional and procedural adjustment to achieve a better socio-ecological outcome in the future.

5.1 Conclusion

Being the world's largest archipelagic state, both land and sea in Indonesia are vital for the livelihood of its people. Since 2007, the national government has required every province to develop their MSP on top of the long-standing TSP as a tool to regulate spatial and resource utilization on land and sea. Due to Indonesia's maritime characteristic, natural and human activities on the land have some impact on the sea, and vice versa. Thus, the two plans need to be coordinated to achieve the optimal (especially ecological) impact. As I have shown in the case of Bali, the management and planning of sea space are very important for the province's economic development and livelihoods, not unlike the importance of land. Surely, not all provinces in Indonesia have the same socio-ecological characteristic, development pressures, and institutional challenges in comparison with Bali. However, every province has substantial sea space and resources, on top of their land, under their jurisdiction, and therefore, land-sea interactions are critical to consider. Moreover, the spatial planning system in Indonesia is governed by the national

government and thus identical throughout all provinces. Therefore, national government plays a big role in 'streamlining' the planning process of both realms.

Unfortunately, the current methods of planning lack adequate integration, which may threaten the plans' objectives. Although a more integrative planning process and the outcome are deemed desirable for various socio-ecological reasons, they are not being pursued due to institutional and technical/adaptive challenges. Institutionally, integration of MSP and TSP is mainly impeded by: current legislation that separates them; lack of procedures or guidelines for the harmonization of the plans; a hierarchy of the coordinating body that is biased toward TSP; planning procedures that are not aligned; and sectoral ego between organizations that are involved in the two planning regimes. Moreover, integration is also hampered by technical problems such as: difficulty in optimizing spatial allocation for sea space, let alone cross-realm; low capacity at provincial/local level government; lack of data in terms of quantity and quality; and low budget allocated for spatial planning. Beyond those challenges, low commitment and concern from the provincial government leader has pushed the land-sea considerations to the sidelines and prevented greater public participation in spatial planning, especially MSP.

The current TSP and MSP system in Indonesia is relatively advanced in comparison to other countries, especially the integration of the permitting/licensing system. However, in terms of spatially planning the two, the current harmonization procedure leaves something to be desired. To address these issues, I offer several recommendations that the government at national, provincial, and local levels could take.

5.2 Recommendations

To make a more efficient and integrated planning of MSP and TSP (as well as capturing the land-sea interaction better), I propose for the TSP and MSP revisions to be conducted together during the next revision of each province's TSP. The dates will vary across provinces, but they all should fall within a five-year period from the end of 2019 when the MSPs of all provinces should be completed. The two plans should still be planned separately as per the laws regulating spatial planning. However, the ministries (especially the Ministry of Maritime Affairs and Fisheries (KKP) and Ministry of Agrarian and Spatial Planning – National Land Agency (ATR-BPN)) should work on a guideline that can be used to operationalize harmonization (including the strategic environmental assessments/SEAs) as well as aligning the planning procedures of the two plans. They should also work with the other ministries to come up with a more equitable institutional arrangement of the regional spatial planning coordinating team (TKPRD). To make this possible, the national government should work with the provincial governments, especially the leaders and the relevant departments, by stressing the importance of MSP (and TSP) as well as educating them on the significance of cross-realm interactions in spatial planning. In the long term, the legislature (with the help of relevant ministries) should look into reviewing and revising the spatial planning laws to accommodate a more integrative planning approach. To achieve these short- and long-term goals, I have outlined below the actions that should be taken by the relevant actors.

In the short term, KKP needs to do an outreach program to raise awareness of the local governments, especially the leaders (governors and regional secretaries), of the importance of MSP and how it relates to TSP. In turn, the provincial government then needs to raise public awareness and participation in spatial planning, especially MSP, and land-sea interactions that are relevant to

their region. In doing so, the role of local academics and NGOs is very important not only to bridge the government and public but also to contribute to the scientific research and analysis of land-sea interactions. Improving the capacity of local governments in technical aspects of spatial planning, such as mapping and data collection, is critical, and also needs to be guided by the national ministries. The governors and the legislature then need to allocate ample budget for the next round of spatial planning to be able to improve the capacity, data, and planning process.

In anticipation of the revision of MSP and TSP, the KKP should evaluate the MSP and TSP data of all provinces and review the land-sea interactions that have been considered in the planning process. They should then work with the ministry of ATR-BPN in creating a guideline for harmonization that should be part of the development or revision of MSP and TSP, using the evaluation of the plans as the basis, while also working on streamlining the planning procedures of the two plans. This should materialize in the form of the spatial planning guideline revision as a general directorate regulation. The two ministries (KKP and ATR-BPN), along with the Environment and Forestry Ministry (KLHK), should create a ministerial regulation to support the integration of SEAs of TSP and MSP, which will save resources and time for the SEAs' development. The Ministry of Internal Affairs (Kemendagri) needs to work with the KKP and ATR-BPN to revise the ministerial regulation on regional coordination team (TKPRD), which is biased toward the development of TSP. Ideally, the local department that is in charge of developing the MSP should have the same position (as co-vice chair) with the department handling the TSP to avoid issues that have arisen from the imbalance of power and sectoral ego.

During the next TSP revision of each province, I strongly urge the KKP to encourage or even better, create a ministerial ruling for every provincial government to review and revise their MSP at the same time. By doing this, the subsequent review and redevelopment of TSP and MSP

will be aligned in every province. It is more realistic to align the revision of MSP since the local government will not start from zero and they have prior experience in the MSP development. This change could be done as the current regulation allows for earlier MSP revision (or not according to the five-year interval) if there is a regulatory change or scientific evidence that may support a change in spatial allocation. Thus, the ministry will need to ensure that the provincial government, in collaboration with local academics and NGOs, performs the research and analysis of the allocated spatial plans and their cross-realm impacts.

With both TSP and MSP to be planned at the same time, several things need to be adjusted. First, the planning procedures of the TSP and MSP need to be adjusted. Although the current steps in the planning process are similar, several steps could be aligned to make sure that there would be equal milestones achieved by both plans along the way. Thus, the TSP and MSP teams could meet and discuss the proposed strategy and spatial allocation of the two plans instead of a simple *post-hoc* agreement as a formality between two departments. Table 13 below summarizes the merged procedure for MSP and TSP development. This way, the public consultation of the plans could happen at the same time, which will give the public a clearer image of both TSP and MSP spatial vision. One component of the procedure that is essential for the harmonization is the SEA, which I recommend to be performed simultaneously for both plans. This requires greater coordination between the environmental department, the TSP and MSP departments. Second, the organizational hierarchy of spatial planning coordination team (TKPRD) needs to be adjusted by now. As I have recommended, the department in charge of developing the MSP should have the co-vice chair position with the department in charge of TSP to ensure that MSP will not be viewed as the lesser part of spatial planning. Third, the governor (and the regional secretary) also need to ensure that the teams that are developing the plans represent their department interests in the two

plans. They should not be sending representatives from different sections of the department anymore. With this adjustment, I argue that the development of TSP and MSP would be more efficient and effective since it will cut down on repetitive procedures (e.g., public consultations and SEA), ensure better knowledge and information distribution among the actors involved in spatial planning, and reduce cross-realm conflict over spatial utilization.

Planning Steps	TSP and MSP	PC
1. Preparation	Governor creates planning team through stakeholder mapping process and involves the regional spatial planning coordinating body. Secondary data assessment, review of the previous plan. Public announcement.	x
2. Data and Information Gathering	Collection of primary and secondary data (basic and thematic maps). Technical consultation of data and thematic maps.	x
3. Data Analysis	Data processing and analysis. Conceptual drafting of the policy and strategy. Technical and public consultation of the analysis and strategy (can be in the format of “initial document” for the MSP)	X
4. Conceptual Drafting	Spatial plan sketch. Spatial suitability analysis. Technical and public consultation of the proposed draft (can be in the format of “interim document” for the MSP)	X
5. Regional Regulation Development	Final revision and ministerial input Academic text on regional regulation of TSP and MSP. Spatial plan ‘translated’ and drafted into regional regulation. Public announcement	x
6. Finalization	Regional regulation enacted	

Table 13. Recommended provincial spatial planning development procedure (PC: Public Consultation, x: may be required but limited, X: required to be performed together)

The recommendations that I propose are made to synchronize the two plans within the “harmonious, compatible, and balanced” normative criteria of the spatial planning regulation instead of integrating them. Integration of the two plans is not possible under the current regulation since the spatial planning laws forbid it. Changing the law will require greater efforts, political willingness, and time. Thus, I envision a more integrative approach to be possibly taken on the future, specifically during the re-development of the MSP (in 15-20 years). Admittedly, it is a bit

premature to imagine what kind of technology will be available and applicable for spatial planning in more than a decade. However, there are several institutional settings that need to be addressed if Indonesia is going to adopt an integrated approach to land-sea spatial planning. As mentioned before, the laws (specifically Laws No. 26 and 27 Year 2007) will need to be reviewed and revised. This requires the cooperation of the ministries, mainly the KKP and ATR-BPN, with the legislature to revise articles that are prohibiting spatial planning integration. The said ministries will also need to work with the Environmental and Forestry Ministry to come up with specific integration criteria, standards, and procedures that provincial government needs to achieve and follow in planning for TSP and MSP. Criteria that should be included, among others: downstream impact estimation of landward development; spatially holistic planning requirements; and flood/saltwater intrusion risk (especially related to sea level rise). This should ideally be codified in national law if possible, or ministerial regulations. Table 14 below summarizes the short- and long-term recommendations that various actors should take to achieve greater integration of the two plans.

Actors	Short Term (Post MSP Establishment)	Long Term (Revision/Development of MSP and TSP)
<i>National Government</i>		
1. Ministry of Maritime Affairs and Fisheries (KKP)	Promote the importance of land-sea consideration in the provinces, educate provincial government and departments Review the planning procedure for MSP and TSP with ATR-BPN	Regulate the MSP development/revision to match TSP Revise planning procedure to be more aligned with TSP
2. Ministry of Agrarian and Spatial Planning (ATR-BPN)	Review the planning procedure for MSP and TSP with KKP	Revise planning procedure to be more aligned with MSP
3. Ministry of Internal Affairs (Kemendagri)	Review the TKPRD hierarchy and role with the ministries involved in spatial planning	Revise the TKPRD regulation and institution
4. Ministry of Environment and Forestry (KLHK)	Review SEA regulation to include land-sea connectivity as part of consideration/analysis	Develop a more integrated SEA of MSP and TSP
5. Legislature (DPR)	N/A	Review and revise the laws to accommodate a more integrated approach
<i>Local Government</i>		
1. Governor and Regional Secretary	Promote and raise public awareness of MSP. Allocate a sufficient budget for the next planning process.	Take a more proactive role in leading both spatial planning development
2. Department in charge of MSP	Promote and raise public awareness of MSP Learn more about the region's land-sea interactions Increase human resource capacity	Revise/redevelop the MSP according to a more integrative regulation
3. Department in charge of TSP	Learn more about the region's land-sea interactions	Revise/redevelop the TSP according to a more integrative regulation
<i>Others</i>		
1. NGO and Academics	Promote and raise public awareness of MSP and MPA Participate in the research of land-sea connectivity	Continue to contribute to spatial planning by providing technical assistance and bridging the public-government

Table 14. Summary of recommendation

In general, the government need to define “integration” or “synchronization”, whichever term used, more precisely, and create operational guidelines with criteria or standard to achieve the desired state between the two plans. Although socio-ecological features of land-sea space varies from one provinces to another (let alone across countries), there are several broad categories (mentioned by Alvarez-Romero) that can be used to organize the aspects that need to be included in the development of the aforementioned guideline. These guideline then need to be followed by appropriate measure at local or regional level where the scale of land-sea interactions are more comprehensible. The “appropriate” response will be subject to the technical and institutional challenges that each province faces. Again, in this regards, the role of national government is crucial to enable the development of a stronger capacity of regional governments and participation of local actors, be it the publics or NGOs.

5.3 Reflections and Future Research

In this research, I have made an institutional analysis of spatial planning policy and development in Indonesia, with a specific case of Bali. The finding of the research contributes to the scientific discourse of land-sea spatial planning integration, a concept that is widely regarded as desirable, although without a clear objective and measures to achieve it. I used the well-regarded SES Framework to unpack the institutional variables and how they relate to each other in the development of provincial spatial planning and how cross-realm impact of land-sea interactions is taken into consideration in spatial planning. I found that institutional analysis of the SES Framework is useful for analyzing the institution of an atypical resource such as space in comparison to the more “common” natural resources (such as water and timber).

Indonesia presented a rather moderate picture of spatial planning institutions, neither as top-down as China nor as liberal as the US. Although it also does not provide a clear guideline in

achieving integration, Indonesia has made some effort to “harmonize” the spatial allocation. In the end, I made several recommendations that are specific to land-sea planning gaps in Indonesia. However, they are country-specific and limited to the institutional gaps that Indonesia is facing. To better understand how we can achieve land-sea integrated spatial planning, I suggest explorations of the following subjects in the near future: 1) comparative analysis of MSP-TSP in all provinces in Indonesia; 2) land-sea interaction and spatial allocation analysis of MSP and TSP; and 3) comparative institutional analysis of other countries MSP and TSP program.

As mentioned before, MSP is a relatively young instrument for development control in comparison to TSP. MSP is still a developing subject that is facing various technical and institutional challenges due to the nature of the environment and historical governance. Nonetheless, it holds great potential to regulate marine space, a common pool resource, which is a very important ecosystem for the survival of humankind. As I have presented, one aspect that needs to be examined more closely is the relationship of MSP with TSP. The two realms are different, but they interact through various processes and influence each other. Most MSP and TSP development, not only in Indonesia but all around the world, tend to miss the importance of this aspect in planning both of them due to the asymmetry of awareness, knowledge, and urgency of planning on the land. This oversight may jeopardize the objectives of spatial planning, especially with regards to environmental sustainability. I have suggested several recommendations to address this issue for the Indonesian context. The challenge for other countries differs significantly due to various difference, especially with regards to ocean governance institution, which vary significantly. Nevertheless, the national or federal government all around the world need to take greater initiative for regulating and overseeing MSP since it requires coordination of policies and plans at greater scale that transcends administrative boundary. This does not diminish the

importance of local participation at all, especially when it comes to the synchronization of land and sea planning. However, it is imperative that national governments develop the appropriate measure (such as regulation, policy, or guideline) to synchronize the land and sea spatial development.

Appendix A.

Interview Guideline

Interview Guideline and Sample Question

The following questions are designed to answer the thesis question about the opinion of the planning participants regarding the institutional matter and planning mechanism of the marine spatial plan and the stakeholders' experience with the process. The interview will be conducted using open-ended questions, as this component will constitute the qualitative part of the research.

1. Background Information

- When and where were you born?
- What is your highest level of education and program?
- What are your job and title/position? How long have you been working there?

2. Role and Interest in RZWP3K/RTRW Planning Process

- What is your position and role in the RZWP3K/RTRW planning development?
- What is your institution and personal interest in this planning development?
- When did you start to be involved in the planning process? How did you get to be involved?

3. Perception/Perspective on Development/Environment Condition of Bali *(for 1st series interviewees)*

- What is your opinion with regards to the current state of development (physical and economic) in Bali, island wide?
- How has it affected the socio-cultural and environmental condition in Bali?
- To be more specific spatially, what do you think about development in the coastal and marine region of Bali and its impact on the environment? State any particular location that you have in mind, if there is any.

4. Perspective on Marine Spatial and Land Use Planning in Bali *(for 1st series interviewees)*

- What do you think of the latest Marine Spatial Plan proposal (Or the most recent proposal, if you have not seen the latest)? How do you think it relates to the 2009 provincial Land Use Plan? Are they well integrated/synchronized? In what aspect (spatial/function)? (Or vice-versa)
- Do you think the proposed plan(s) cater to your institution (or other institution) interests adequately? In what way?
- With the current and planned provincial government apparatus, are you optimistic that these plans will be able to control and manage the regional (coastal) development towards a better state? Why?

5. Experience in the Planning Process *(for 1st series interviewees)*

- What do you think of the planning process? Do you think the process is fair for you and/or stakeholders involved?

- Do you think you made a significant contribution with your participation in the process?
- What challenges did you (or anyone) face during the planning process? In what particular stage or phase to be precise?

6. Opinion on the Institutional Aspects of the Planning Mechanism and Policy

- Do you think the planning development have involved all the relevant authorities and stakeholders (representative)? What do you make of the organizational hierarchy and planning procedure?
- In your opinion, should there be any additional authority/stakeholder that could participate in the process (or perhaps should not be included)? Why?
- In general, what do you think about the current organizational arrangement and the planning process of marine spatial planning in Bali (and Indonesia if you have)?
- In particular, what do you think of Maritime & Fisheries Agency as the leading organization in charge of the RZWP3K? (and the Agrarian/Public Works Agency in charge of the RTRW)
- What about the regulatory change that shift the authority from Bappeda to Maritime & Fisheries Agency? Do you think this move helped (or impede) the process in any way?
- Do you think the current arrangement and planning procedure are effective and efficient enough? In what way they could be improved?
- What is your opinion with regards to the 2014 national regulatory change that shift back the authority of marine space from the regency to provincial government?
- Challenge in RZWP3K/RTRW Planning in general?

7. Relationship between RZWP3K and RTRW

- What is the relationship between RZWP3K and RTRW?
- What do you think of the position between the RZWP3K and RTRW in national development planning system?
- How do you define integration/synchronization in RZWP3K and RTRW?
- How do you think the regulation define it and is it sufficient? What about the actual implementation?
- Would a more integrated approach be desirable? In what way?
- If any, what do you think prevent a greater integration between the two plans?

8. Additional Comment

- Do you have any input to improve the RZWP3K/RTRW development?
- Any question about this research?

Appendix B.

List of Interviewees

Name	Title	Institution/Organization
<i>First Interview Series</i>		
D. K. Wira Sanjaya	Nusa Penida MPA Project Leader	Coral Triangle Indonesia
Hanggar Prasetio	GIS Coordinator	Conservation International Indonesia
I Gede Hendrawan	Lecturer	Udayana University
I Gede Sudiarta	Lecturer	Warmadewa University
I Komang Kusumaedi	Head of Division, Emergency Logistic	Regional Disaster Prevention Agency
I Made Iwan Dewantama	Bali Project Manager	Conservation International Indonesia
I Made Suastika	Staff	Tourism Department
I Made Sudarsana	Head of Section, Maritime	Maritime and Fisheries Department
I Made Teja	Head of Division, Planning and Enforcement	Environmental Department
I Nengah Sudana	Head of Section, Spatial Planning and Community Empowerment	Maritime and Fisheries Department
I Wayan Sudhiana	Staff	Tourism Department
Ida Ayu Indah	Head of Division, Tourism Industry	Tourism Department
Ketut Sudiarta	Principal	CV. Rekako
Made Arca Eriawan	Principal	PT. Wartha Bakti Mandala
Made Sudiarsa	Head of Division, Infrastructure and Regional Development	Regional Development Planning Agency
Ngakan Kirim	Head of Spatial Planning Division	Public Works and Spatial Planning Department
Nyoman Trisnawati	Head of Section, Multimodal Management	Transportation Department
Permana Yudianto	Head of Section, Program and Evaluation	Coastal and Marine Resource Management Agency
<i>Second Interview Series</i>		
Abd. Rahman As-syakur	Lecturer	Udayana University

Adi Pasaribu	Head of Section, Region II, Sub-directorate Maritime and Fisheries	Ministry of Interior
Arief Sudianto	Head of Section, Special National Strategic Areas	Ministry of Maritime Affairs and Fisheries
Bintang Aulia Pradnya Paramita	Head of Section, Provincial and Regency Development	Ministry of Agrarian Affairs and Spatial Planning – National Land Agency
Endiena Bulan Mutiara Sani	Staff	Ministry of Maritime Affairs and Fisheries
Fitriani	Head of Section, Region II, Regional Land and Space	Ministry of Interior
Krishna Samudra	Head of Regional Zoning Sub-directorate	Ministry of Maritime Affairs and Fisheries
M. Emil W. Pradana	Staff	National Development Planning Agency
Rinella Tambunan	Spatial Planning Sub-directorate	National Development Planning Agency
Syofyan Hasan	Head of Strategic Zone Sub-directorate	Ministry of Maritime Affairs and Fisheries
Yosi Buditomo	Head of Section, Eastern Region Zoning	Ministry of Maritime Affairs and Fisheries

Appendix C.

List of Regulations

Type of Regulation	Regulation Code	Title
1. Legislative		
<i>Law (Undang-Undang/UU)</i>	Law Number 7 Year 2004	Water Resource
	Law Number 25 Year 2004	National Development Planning System
	Law Number 32 Year 2009	Environmental Protection and Management
	Law Number 4 Year 2011	Geospatial Information
	Law Number 12 Year 2011	Establishment of Regulation
	Law Number 23 Year 2014	Local Governance
	Law Number 31 Year 2004	Fisheries
	Law Number 27 Year 2007	Coastal Areas and Small Islands Management
	Law Number 1 Year 2014	Amendment of Law Number 27 Year 2007 about Coastal Areas and Small Islands Management
	Law Number 32 Year 2014	Maritime Affairs
	Law Number 5 Year 1960	Basic Agrarian Law
Law Number 26 Year 2007	Spatial Planning	
2. Executive		
<i>a. Government Regulation (Peraturan Pemerintah/PP)</i>	PP Number 8 Year 2008	Steps, Development Procedure, Control, and Implementation Evaluation of Regional Development Plan
	PP Number 68 Year 2010	Form and Procedure of Public Participation in Spatial Planning
	PP Number 37 Year 2012	Watershed Management
	PP Number 18 Year 2016	Regional Government Apparatus
	PP Number 46 Year 2016	Strategic Environmental Assessment Procedure
	PP Number 24 Year 2018	Integrated Electronic Business Licensing Service
	PP Number 15 Year 2010	Administration of Spatial Planning
	PP Number 8 Year 2013	Accuracy of Spatial Plan Maps
	PP Number 13 Year 2017	National Spatial Plan
<i>b. Presidential Regulation (Peraturan Presiden/Perpres)</i>	Perpres Number 63 Year 2015	Ministry of Maritime Affairs and Fisheries

	Perpres Number 17 Year 2015	Ministry of Agrarian Affairs and Spatial Planning
	Perpres Number 20 Year 2015	National Land Agency
<i>c. Presidential Decree (Keputusan Presiden/Keppres)</i>	Keppres Number 6 Year 2017	Establishment of the Outermost Small Islands
<i>d. Ministerial Regulation (Peraturan Menteri/Permen)</i>		
1. Ministry of Home Affairs (Kementerian Dalam Negeri/Kemendagri)	Permen Number 13 Year 2016	Evaluation of the Draft of Regional Regulation on Regional Spatial Plan
	Permen Number 115 Year 2017	Control Mechanism for the Regional Space Utilization
	Permen Number 116 Year 2017	Regional Spatial Planning Coordination
2. Ministry of Environment and Forestry (Kementerian Lingkungan Hidup dan Kehutanan/KLHK)	Permen Number 69 Year 2017	Implementation of PP 46 Year 2016 about Strategic Environmental Assessment Procedure
3. Ministry of Maritime Affairs and Fisheries (Kementerian Kelautan dan Perikanan/KKP)	Permen Number 1 Year 2016	Management of Data and Information in Coastal Areas and Small Islands Management
	Permen Number 8 Year 2018	Procedure for Determining Management Area of Customary Law Community Spatial Utilization in Coastal Areas and Small Islands
	Permen Number 15 Year 2010	Organization and Working Procedure of the Ministry of Maritime Affairs and Fisheries
	Permen Number 23 Year 2016	Management Planning of Coastal Areas and Small Islands
	Permen Number 25 Year 2012	Establishment of Regulations in the Ministry of Maritime Affairs and Fisheries
4. Ministry of Agrarian and Spatial Planning/National Land Agency (Kementerian Agraria dan Tata Ruang-Badan Pertanahan Nasional/ATR-BPN)	Permen Number 6 Year 2017	Procedures for Regional Spatial Plan Review

	Permen Number 1 Year 2018	Development Guideline of Province, Regency, and City Regional Spatial Plans
3. Regional		
<i>a. Regional Regulation (Peraturan Daerah/Perda)</i>	Perda Bali Number 16 Year 2009	Regional Spatial Plan for the Province of Bali Year 2009-2029
<i>b. Gubernatorial Decree (Keputusan Gubernur/Kepgub)</i>	Kepgub Bali Number 739 Year 2017	Establishment and Structure of the Document Preparation Team Membership of the Balinese Provincial Coastal and Small Islands Zoning Plan

*List of Regulations (Color Code: **Black-General Spatial Regulation**, **Blue-Related to MSP**, **Green-Related to TSP**)*

Appendix D.

Second-Tier Variables of the SES Framework for MSP and TSP

Variables		TSP (RTRW)	MSP (RZWP3K)
<i>Resource System (RS)</i>			
RS1	Sector	Multi-sectoral use of terrestrial space (forestry, fisheries, agriculture, mining & energy, industry, tourism, residential, commercial, defense, transportation, conservation)	Multi-sectoral use of marine space (forestry-mangrove, fisheries, aquaculture, salt production, mining & energy, industry, tourism, transportation, defense, conservation)
RS2	Clarity of boundary	Clearly defined spatial terrestrial jurisdiction. The provincial administrative boundary is defined by a delimited line between provinces, international boundary, and the coastline, except for islands that are less than 2000 sq. Km. Coastline (the administrative boundary between land-sea) is now strictly controlled by the National Geospatial Information Agency (BIG), so there is no more discrepancy between the two.	Technically well-defined marine spatial jurisdiction, which is 12 miles seaward from the coastline, and the delimited boundary between provinces or neighboring nations. It could also include small islands that are less than 2000 sq. Km.
RS3	Size of the resource system	Varies according to the administrative boundary.	Varies according to the administrative boundary.
RS4	Human-Constructed Facilities /Infrastructure	Extensive human-constructed physical development on land, especially in urban region (buildings, infrastructure, and open spaces). Infrastructure network greatly influences planning. They are ranging from transportation (rail, street, and airport), communication, energy, and water (pipes, sewer system).	Limited human-constructed facilities on the sea space (reclaimed land, oil & gas extraction facility, non-vessel floating structures) Significant but limited infrastructure influence on planning compared to land. Ranging from transportation (port, shipping lanes network), communication, energy, and water (underwater cables/pipes).
RS5	Productivity	Not applicable for terrestrial space as a resource (See RU2 for replenishment).	Not applicable for marine space as a resource (See RU2 for replenishment).

		Natural resource productivity varies from one ecosystem (or province) to another.	Natural resource productivity varies from one ecosystem (or province) to another.
RS6	Equilibrium properties	NA	NA
RS7	Predictability	Varies, but natural resource dynamic is generally more predictable.	Less predictability (greater uncertainty) of natural resource dynamics.
RS8	Storage characteristic	NA	NA
RS9	Location	Spatial distribution of natural resources varies. Population distribution, human activities and man-made structures generally denser around urban agglomeration or other centers of growth (town, villages).	Spatial distribution of natural resources varies, but living resources (and other resources that are derived from living resources such as oil and gas) generally concentrated closer to the coastline and shallower water (greater biodiversity). Human activities (use of sea space) are more intense closer to the coast.

Resource Units (RU)

RU1	Resource unit mobility	Terrestrial space as a resource is immobile. The mobility of natural resources varies but mostly sedentary.	Marine space as a resource is immobile. Natural resources mobility vary. However, typically, natural living resources are characterized by higher mobility than the terrestrial counterpart (fisheries).
RU2	Replacement rate	Terrestrial space is naturally irreplaceable. However, there is a general trend toward coastal erosion due to sea level rise that decreases land space. It can be artificially replaced by reclamation process. Natural resources replacement rate varies but generally decreasing due to consumption and habitat loss.	Marine space is naturally irreplaceable. There is a general trend toward coastal erosion that increases sea space. This may not translate into greater administrative marine space because marine jurisdiction delineation is tied to the coastline. As of now, the boundary is limited, and hence the spatial extent is fixed. Natural resources replacement rate varies but generally decreasing due to consumption and habitat loss.
RU3	Interactions	Atmospheric, bio-geological, and surface/underground water natural process interaction. Some consideration of species interaction in planning. Higher intensity of human-nature interaction.	Atmospheric and oceanographic interaction. Greater consideration of species interaction, especially with regards to migratory species in planning. Less intensity of human-nature interaction. Some consideration of natural land-sea process in the coastal region.

RU4	Economic value	Economic values of terrestrial space and resources are relatively well understood and determined by the market. The value of natural resources varies.	Economic values of marine space are not very well understood since there is no private property regime on the ocean that made it tradeable. Ecosystem service valuation is still a developing subject for marine resources. On the other hand, marketable natural resources value is quite well understood and important for the coastal community (sustenance fishing) and the broader nation's necessity (oil and gas, fisheries). The value of natural resources varies.
RU5	Size	The dimension of the allocated spatial unit varies, with smaller zoning unit (ultimately at lot size) at the city level and typically larger unit at the rural region.	The dimension of the allocated spatial unit varies, with mostly larger zoning unit the further away from the coast and smaller, more detailed zoning size the closer to the coast.
RU6	Distinct character	Both realms significantly different, biophysically.	Same.
RU7	Spatial or temporal distribution	Less vertical biodiversity variation. Resource distribution perceived more as two-dimensional in nature. Natural resource distribution within the space depends on the bio-geographical and geological landscape from the natural process. Human-made physical development and activities spatial distribution greatly depend on urban-rural development.	Considerable vertical variation of resources from the seabed, water column, and surface. Characterized by more three-dimensional resource distribution. Generally, more valuable and biodiverse natural resources are located within space closer to the coastline. Similarly, human-made physical developments and activities also occur closer to the land.

Actors (A)

A1	Group size	All stakeholders, among others: the population within the province (and neighboring provinces), customary law communities, and government (local and national).	Primary stakeholders, which are coastal and small island resource, such as traditional and modern fishermen, aqua culturist, tourism entrepreneur, and communities (local, traditional, and customary law).
A2	Socioeconomic attribute	Varying, heterogeneous, socio-economic attribute based on provincial communities' characteristic.	Varies but relatively more homogeneous socio-economic characteristic of coastal population due to similarities in coastal resource dependence and activities.

A3	History	The modern form of TSP has been practiced since the '60s with the most recent development in 2007 (Spatial Planning Act). Spatial planning on terrestrial realm has been long-established and influenced the public for a long time.	Relatively recent development with the enactment of Management of Coastal Areas and Small Islands Act in 2007. Spatial planning and management of the sea zone is a recent phenomenon and not very well known publicly. In the past (the 80-90s), several pilot ICZM project was developed and practiced in selected areas (often with the help of foreign aid organization such as USAID, World Bank, and Asian Development Bank).
A4	Location	Within the terrestrial domain.	Within the terrestrial and marine domain.
A5	Leadership	At the provincial level, governor (and regional secretary) as the head of the province lead the development of spatial planning. The provincial agency in charge of spatial planning coordinate and lead the technical group. Lower level local leaders (mayor, regent, and village head) are also important.	At the provincial level, governor (and regional secretary) as the head of the province lead the development of spatial planning. The provincial agency in charge of maritime affairs and fisheries coordinate and lead the technical group. Lower level local leaders (mayor, regent, and village head) of the coastal administrative area are also important.
A6	Social capital	Local norms and culture. Religion. The rule of law.	Local norms and culture. Religion. The rule of law.
A7	Knowledge of the SES	Relatively well understood.	Not very well understood. Related to the limitation of scientific understanding and technological capabilities of perceiving marine dynamic (S7).
A8	Resource dependence	High dependence of land space for living, work, factor of production, and ecosystem services.	High dependence of sea space for work, factor of production, and ecosystem services for (mostly) coastal community.
A9	Technology used	Various production and activity assisting technologies applicable. Transportation technology is arguably an aspect that shapes the structure and pattern of spatial allocation in the land (road network, railways, etc.)	Various production and activity assisting technologies applicable. Most considerable technology application within the sea space is water transportation as well as fisheries and aquaculture technology.

Governance Systems (GS)

GS1	Government organization	National government develops the legislation for TSP. Local (provincial) government is authorized to develop the TSP, which is delegated to the relevant agency. ATR-BPN ministry is in charge of setting up the procedure and guiding the province. The plan requires further scrutiny and approval of the Ministry of Internal Affairs, ministerial coordination team, and Regional Parliament.	National government develops the legislation for MSP. Local (provincial) government is authorized to develop the MSP, which is delegated to the relevant agency. Ministry of maritime affairs and fisheries is in charge of setting up the procedure and guiding the province. The plan requires scrutiny and approval of Ministry of Internal Affairs (national level), ministerial coordination team, and Regional Parliament.
GS2	NGOs	Less involvement in spatial planning.	More involved in spatial planning with regards to environmental-conservation issue, especially in the development of MPA, as well as in research, information sharing, and facilitating participation.
GS3	Network structure	Combination of a top-down and bottom-up mode of planning and management (with movement toward greater public participation). Compulsory public participation by design, with a minimum of two public consultations of the proposed plan.	Combination of a top-down and bottom-up mode of planning. Greater consideration of public participation in planning. Compulsory public participation with a minimum of two public consultations, once before and after the creation of the interim document proposal.
GS4	Property right systems	<p>Right to own land is an exclusive right for Indonesian citizen. The land certificate is issued by the government. Beyond land ownership, the government regulates property rights for land use, building use, lease of property, forestry, and mining.</p> <p>Permitting system is now merged into one “Online Single Submission” (OSS) system that will refer to the spatial detail plan (<i>RDTR</i>, which is derived from provincial TSP) allocated land use as the reference for approval of location permit (that will be the basis of land/building use permit).</p>	<p>Territorial sea is owned by the state. There are two types of license that can be issued for sea space utilization: location and management permit. Location permit gives the holder the right to use the water space (or small islands), and the management permit gives the holder the right to use or extract the resources within the spaces.</p> <p>Permitting system is now merged into one “Online Single Submission (OSS)” system that will refer to the provincial MSP allocated zoning use as the reference for approval of location and management permit.</p>

GS5	Operational choice rules	The operational rules for permitting system is controlled by national policy, see GS4. For monitoring and sanction rule, see GS8.	The operational rules for permitting system is controlled by national policy, see GS4. For monitoring and sanction rule, see GS8.
GS6	Collective-choice rules	The spatial plan is developed according to the provincial medium-term development plan that outlines the socio-economic and ecological target that is assembled by the BAPPEDA (Regional Development Planning Agency). The spatial allocation is developed by the team composed of relevant regional government agencies and external technical experts. It requires some public participation through data and proposal consultation where the public could provide some input and the government agencies involved will need to collectively agree on the draft proposal.	The spatial plan is developed according to the provincial medium-term development plan that outlines the socio-economic and ecological target that is assembled by the BAPPEDA. The spatial allocation is developed by the team composed of relevant regional government agencies, external technical experts, and other NGOs that may be invited by the governor. It requires some public participation through proposal consultation where the public could provide some input. The team involved will need to collectively agree on the draft proposal.
GS7	Constitutional-choice rules	The Constitution of Indonesia (UUD 1945) and the Laws outline the rules for local governance and creation of TSP, which is a provincial legal product that is drafted by the provincial government with the assistance of national ministries and validated by the regional legislative body. The ATR-BPN ministry created the technical rule and procedure (including a detailed guideline on participants that is required to be involved) that the local government needs to follow in developing the TSP.	The Constitution of Indonesia (UUD 1945) and the Laws outline the rules for local governance and creation of MSP, which is a provincial legal product that is drafted by the provincial government with the assistance of national ministries and validated by the regional legislative body. The Ministry of Maritime Affairs and Fisheries created the technical rule and procedure that the local government needs to follow in developing the TSP.
GS8	Monitoring and sanction	Monitoring of land use is authorized by provincial and city/regency government (and national ministries' "technical implementation unit" where applicable). Public involvement is encouraged through filing complaint. The investigative role is given to national police or local civil servant within the agency that is responsible for TSP.	Monitoring of land use is authorized by provincial and city/regency government (and ministry of maritime affairs and fisheries "technical implementation unit" where applicable). Other institutions in charge of monitoring may include maritime and fisheries agency, Indonesia Maritime Security Agency (BAKAMLA), or Water Police (POLAIR). Public involvement is encouraged through filing complaint. The investigative role is

Administrative and criminal sanctions are regulated by national government regulation and law (No 26 Year 2007). Sanctions may be applicable not only for the user defying the spatial regulation, but also for the government official that passes permit not according to the spatial plan. There is some specific monitoring mechanism for specific sector (i.e., forestry, mining). Customary law communities may have their monitoring and sanction mechanism (i.e., in community forest).

given to national police or local civil servant within the agency that is responsible for MSP.

Administrative and criminal sanctions are regulated by national government regulation and law (No 27 Year 2007). Sanctions may be applicable for the user defying the spatial regulation. Customary law communities may have their monitoring and sanction mechanism (in a community coastal management zone).

Interactions (I)

I1	Harvesting	NA.	NA
I2	Information sharing	Formal mechanism of information sharing happens during public consultation (or other group discussion) that is facilitated by a government agency that is responsible for TSP development.	Formal mechanism of information sharing happens during public consultation (or other group discussion) that is facilitated by a government agency that is responsible for MSP development.
I3	Deliberation processes	Occurs during public consultation (minimum twice) of the planning process.	Occurs during public consultation (minimum twice) of the planning process.
I4	Conflicts	Due to definitive property rights, there is relatively less conflict.	More (expected) conflicts due to less inalienability of sea (and coastal) space property regime. One of the main reason for developing MSP is conflict mitigation in sea space.
I5	Investment activities	Various public and private investment in mostly construction-based development projects or resource extraction (forestry & mining). Growing interest in investment in environmental conservation of rehabilitation by NGOs.	Various public and private investment in mostly resource extraction (fisheries & mining) and the tourism industry. Growing interest in investment in environmental conservation, especially the development of MPA
I6	Lobbying activities	Organized lobbying activities of various interest groups: industries (forestry, mining, trade, service, etc.), environmental NGOs, local community organization.	Organized lobbying activities in various interest groups: industries (fisheries, tourism), environmental NGOs, local community organization.

I7	Self-organizing activities	Self-organizing activities are quite common at the community level, but not really considered in spatial planning (especially at the provincial level). The right to community-based management at the forestry zone by customary law community in customary forest is recognized.	Self-organizing activities are quite common at the community level. Co-management of coastal space by customary law community is recognized and regulated by the government, especially in the context of MPA development and management.
I8	Networking activities	Networking is facilitated by government agency that is responsible for TSP during the planning process.	Networking is facilitated by government agency that is responsible for MSP during the planning process, as well as informally by NGOs.
I9	Monitoring activities	Conducted by the government, with public participation (especially in customary law forest, see GS8).	Conducted by the government, with public participation (especially in customary law coastal zone management, see GS8).
I10	Evaluative activities	The provincial TSP is valid for 20 years. It would be reviewed and evaluated after every five years with the option to revise if necessary.	The provincial MSP is valid for 20 years. It would be reviewed and evaluated after every five years with the option to revise if necessary.

Outcomes (O)

O1	Social performance	Varies according to the long-term provincial development plan that guides the development of the spatial plan. Evaluation indicators to be developed within the TSP. It generally involves a mix of qualitative and quantitative outcomes such as food security, job creation, infrastructure, and housing development, etc.	Varies according to the long-term provincial development plan that guides the development of the spatial plan. Evaluation indicators to be developed within the MSP's management plan. It generally involves a mix of qualitative and quantitative outcomes such as cultural preservation, job creation, etc.
O2	Ecological performance	Measurement of land use deviation from the previous plan. Developed in accordance with the Strategic Environmental Assessment (SEA) to achieve sustainability target based on carrying capacity and limiting factors. Involves a mix of qualitative and quantitative outcomes such as area or percentage of protected forest, protection of paddy field from conversion, etc.	They are developed in accordance with the Strategic Environmental Assessment (SEA) to achieve sustainability target based on ecosystem carrying capacity and limiting factors. Involves a mix of qualitative and quantitative outcomes such as MPA area target, protection of coastal zone, etc.

O3	Externalities to other SES	Included within the SEA analysis, one of the bases of ecological performance. Usually in consideration of forest and catchment areas.	Included within the SEA analysis, although more in consideration of another sector (such as fisheries zone and conservation/MPA).
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Related Social, Economic, and Political Setting (S)

S1	Economic Development	Varies across provinces.	Varies across provinces.
S2	Demographic trend	Increasing, with urban population growth significantly faster than rural.	Typically increasing coastal population.
S3	Political stability	Varies, somewhat dependent on the political cycle.	Varies, somewhat dependent on the political cycle.
S4	Other governance systems	Community-level mode of governance, which have legal recognition especially in forest area (GS8).	Community-level mode of governance, which have legal recognition especially in customary law community coastal area (GS8).
S5	Markets	Regulated market for land as property with clear legal recognition. Harvested resources are tradeable in the open market.	Marine spatial based permit is not tradeable. This applies not only for the private right but also the customary and traditional right (location and management permit). Harvested resources are tradeable in the open market.
S6	Media organizations	TSP development rarely gained the attention of mass media organization. Information or publication regarding the development usually shows up in smaller local publication (print) media.	Similar to TSP, MSP development never appears in mass media coverage. Information or publication regarding the development usually shows up in smaller local publication (print) media.
S7	Technology	Various digital technology to aid spatial planning and monitoring such as GIS-based tool remote sensing, and a wide array of IoT (internet of things) application.	Similar GIS-based tool and remote sensing are applicable to sea space. However, there is limited IoT applicability marine context and technological limitation to monitor activities in the sea (especially the water column and seabed).

Related Ecosystems (ECO)

ECO1	Climate patterns	Tropical climate with higher variances across provinces, especially in mountainous regions.	Tropical climate with fewer variances across provinces.
ECO2	Pollution patterns	Varying household and industrial pollution.	Pollution comes from land-based sources through downstream action that may bring sediment

ECO3	Flows into and out of focal SES	Various man-made flows from land use and land cover change. Natural flows may also affect the accretion or erosion of soil.	(suspended solid), nutrients, toxic chemical, and trash. Another source of pollutions may come from ship pollution and oil spill. Dynamic flows of resources (living and non-living) throughout and across the water column. Land-sea interaction also brought flows of material (sediment).
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Appendix E.

List of TSP Development Team (Province of Bali)

Position	Institution/Organization
Advisor	Governor and Vice Governor of Bali
Chairman	Regional Secretary of Bali
Vice-Chairman	Head of Regional Development Planning Agency (BAPPEDA) of Bali
	Head of Regional Secretariat of Law and Human Rights Bureau
	Head of Public Works and Spatial Planning Department (PUPR)
Secretary	Head of Spatial Planning and Environment Division at BAPPEDA
	Head of Spatial Planning and Housing Division at PUPR
	Head of Regional Infrastructure at BAPPEDA
Team Member	
<i>Government Officials</i>	<ol style="list-style-type: none"> 1. Head of National Land Agency Regional Office 2. Head of Environmental Agency 3. Head of Food Crop Agriculture Department 4. Head of Forestry Department 5. Head of Tourism Department 6. Head of Transportation, Information, and Communication Department 7. Head of Civil Service Police Unit 8. Head of Spatial Planning Subdivision at BAPPEDA 9. Head of Environment Subdivision at BAPPEDA
<i>Academics</i>	<ol style="list-style-type: none"> 10. Indonesian Hindu University 11. Warmadewa University 12. National Education University 13. Denpasar Mahasaraswati University 14. Research and Community Service Institution of Udayana University (UNUD) 15. Research and Community Service Institution of UNUD 16. Research and Community Service Institution of UNUD 17. Research and Community Service Institution of UNUD 18. Research and Community Service Institution of Indonesian Hindu University 19. Research and Community Service Institution of Warmadewa University 20. Research and Community Service Institution of National Education University 21. Head of Indonesian Association of Urban and Regional Planning of Bali

Appendix F.

List of MSP Development Team (Province of Bali)

Position	Institution/Organization
Director	Governor of Bali
Advisor	Regional Secretary of Bali
Chairman	Head of Maritime Affairs and Fisheries Department (DKP) of Bali
Secretary	Head of Regional Development Planning Agency (Bappeda) of Bali
Team Member	
<i>Government Officials</i>	
	1. Head of Environmental Department
	2. Head of Transportation Department
	3. Head of Tourism Department
	4. Head of Forestry Department
	5. Head of Public Works and Spatial Planning Department
	6. Head of Cultural Affairs Department
	7. Head of Investment and One-stop Service Department
	8. Head of Community and Village Empowerment Department
	9. Head of National and Political Unity Agency
	10. Head of Regional Disaster Prevention Agency
	11. Head of Regional Secretariat of Law and Human Rights Bureau
	12. Head of Regional Secretariat of Economic Bureau
	13. Head of Civil Service Police Unit
	14. Head of Meteorology, Climatology, and Geophysics Agency
	15. Denpasar Navy Base Commander
	16. Water Police Director
	17. Head of Denpasar Institute for Coastal and Marine Resource Management
	18. Head of Institute for Marine Research and Observation
	19. Head of Institute for Natural Resource Conservation
	20. Head of Spatial and Environmental Planning Division at Bappeda
	21. Head of Legislation Division at Regional Secretariat of Law and Human Rights Bureau
	22. Head of Fisheries and Food Security Department of Klungkung Regency
	23. Head of Transportation, Maritime Affairs, and Fisheries Department of Jembrana Regency
	24. Head of Fisheries Department of Buleleng Regency
	25. Head of Fisheries Department of Tabanan Regency
	26. Head of Fisheries Department of Badung Regency
	27. Head of Fisheries Department of Karangasem Regency
	28. Head of Food Security, Maritime Affairs, and Fisheries Department of Gianyar Regency
	29. Head of Fisheries and Food Security Department of Denpasar City
	30. Head of Technical Implementation Unit of Nusa Penida Marine Protected Area
	31. Head of Marine and Coastal Conservation Section of DKP
	32. Head of Marine and Small Islands Space Utilization Section of DKP
	33. Head of Marine Resources and Fisheries Section of DKP

Traditional/Religious

Authority Representatives

34. Grand Chief of the Main Assembly of Traditional Village

NGOs

35. Conservation International Indonesia Director

36. Coral Triangle Center Director

Academics

37. Dean of the Fisheries and Marine Science Faculty at Udayana University

38. Dean of Agriculture Faculty at Warmadewa University

Industries

39. Chairman of the Indonesian Water Tourism Association of Bali

40. Chairman of the Regional Council of Indonesian Fishermen Association of Bali

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