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# Background Paper

## Overview of Mangrove Loss, Mangrove Tenure Conflicts, Challenges and Lessons Learned on Mangrove Governance in Cambodia, Thailand and Indonesia

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## Executive Summary

In Southeast Asia (SE Asia), Mangroves have been known for their ecological support to climate action, livelihood assets and coastal protection. 33 percent of the global mangroves are located in SE Asia with one fifth in Indonesia. However, SE Asia still experiences the greatest loss of mangroves which points to systematic problems in mangrove governance that need to be addressed in the region.

This report reviews existing studies to identify major challenges of mangrove governance that cause mangrove tenure conflicts and mangrove loss in Cambodia, Thailand and Indonesia to draw lessons learned for other countries for sustainable mangrove conservation in the region.

The findings of this report showed that the commonalities of governance challenges shared by the three countries that drive mangrove loss and conflicts are, unclear land tenure and land use planning to support mangrove conservation, weak law enforcement, overlapping government jurisdictions and regulations on mangrove management, ineffective cross-sectoral coordination, and limited community participation. A number of lessons learned could be drawn from the three case countries for effective conservation of mangroves in ASEAN.

- In countries where mangrove coverage under protected areas remains small, incorporating more mangrove areas into protected areas is a necessary measure to support mangrove conservation;
- Incorporating mangroves into protected areas may not contribute to mangrove conservation if zoning of protected areas is not clear. Therefore, working to complete zoning of protected areas that have mangroves, making sure Economic Land Concessions (ELCs) are not inside protected areas or do not overlap with the boundary of Community Protected Areas (CPAs) and promoting law enforcement are necessary measures to conserve mangroves.
- Strengthening security of mangrove land tenure and land use planning is important for sustainable conservation of mangroves. However, some forms of tenure could also lead to negative effects depending on how they are used. Granting mangrove tenure for large-scale investment project (e.g. ELC) that are identified as a threat to local communities should be avoided or the appropriate environmental impact assessment should be conducted beforehand in consultation with the community.
- Effective mangrove conservation and restoration still rests on the models of community-based management and customary rights. Therefore, returning the control of mangroves to communities to manage and rehabilitate them could be considered.
- To enable communities to contribute to sustainable mangrove management and rehabilitation, there is a need for; community rights to mangroves be recognized and protected in legislation; community people are able to access justice and conflict resolution mechanisms regarding their mangrove land; stakeholders to provide support

to communities through strengthening local leadership, providing support on technology and resources, promoting local participation and livelihoods and ensuring effective government coordination in support of communities;

- While countries may have already adopted laws and policies to govern mangrove tenure rights (i.e., forestry laws, fishery laws, protected area laws, coastal laws, natural resource management laws or land laws), overlapping regulations remain. Therefore, there is a need to revisit the existing laws to realign them and clarify government's authority across sectors to make sure that the existing laws promote clear mangrove land tenure and strengthen community or customary rights for sustainable mangrove conservation;
- Due to the effects of climate change, building mangrove resilience through mangrove restoration programs is important. Such restoration programs need to be incorporated into the design of protected areas and into integrated coastal management of a country to ensure institutional autonomy, sustainable funding and success of the program implementation.

## 1. Introduction

Mangroves have been increasingly known as valuable natural assets to support ecosystem services and human society. It was estimated that the world had about 14.73 million ha of mangroves in 2020 located across 113 countries. The most extensive mangroves are located in Southeast Asia (33%), in which Indonesia has the largest coverage at one fifth of the global total [1]. Mangroves play unique roles in climate mitigation due to their high capacity to sequester carbon at up to four times the rate of terrestrial forests, therefore mangroves have been known for their ecological support to climate action. Estimates have shown that mangroves could absorb about 350 million megagrams of carbon worldwide [1]. They could also prevent over USD 65 billion in property damage caused by climate change and reduce flood risks to 15 million people every year [2].

In Southeast Asia (SE Asia), mangroves have been considered as livelihood assets for coastal communities and barriers to protect the coasts. Having the most diverse mangrove forests in the world (40 exclusive species and 65 non-exclusive species) [3,4], SE Asia has relied on mangrove timber and non-timber products and mangrove ecosystems for supporting its coastal livelihoods and environment. It was estimated that 30% of the fish catch and almost 100% of the shrimp catch in SE Asia were contributed by mangrove forests [5].

However, with the highest number of mangrove forests, SE Asia also experiences the greatest loss of mangroves [1]. It has lost 245,700 ha representing 4.8% of total mangrove forest from 1996-2020, placing the region ahead of North and Central America and the Caribbean for mangrove loss. While the drivers of mangrove loss in SE Asia have been linked to both human and natural factors, human factors remain the main driver presumably leading to mangrove tenure conflicts, violence and depletion of mangrove ecosystems on the ground [1]. The human factors such as mangrove clearance for agriculture, aquaculture and infrastructure development point to systematic problems in mangrove governance in SE Asia that need to be addressed [6].

Governance is defined as “the norms, institutions and processes that determine how power and responsibilities over natural resources are exercised, how decisions are taken, and how citizens — including women, men, youth, indigenous peoples and local communities — participate in, and benefit from, the management of natural resources” [7]. According to International Union for Conservation of Nature (IUCN), governance is critical for the effectiveness of conservation efforts and the extent to which conservation contributes to human well-being. Improving natural resource governance, including securing rights, benefits both people and nature [8].

This report reviews existing studies to identify major challenges of mangrove governance that drive mangrove tenure conflicts and mangrove loss in Cambodia, Thailand and Indonesia. The three countries were selected for the study because they have experience in mangrove

governance that could provide lessons for other countries in the region. This study has five essential research questions to address as follow:

- What are the trends and drivers of mangrove forest loss in Cambodia, Thailand and Indonesia?
- What are the forms of mangrove tenure conflicts and violations in the three countries?
- What are the existing legal frameworks, polices and key stakeholders that are involved in mangrove governance in the three countries?
- What are the challenges of mangrove governance that drive conflicts and loss of mangrove forests in the three countries?
- What are the lessons learned that could be drawn from the three countries for effective and equitable governance of mangrove forests?

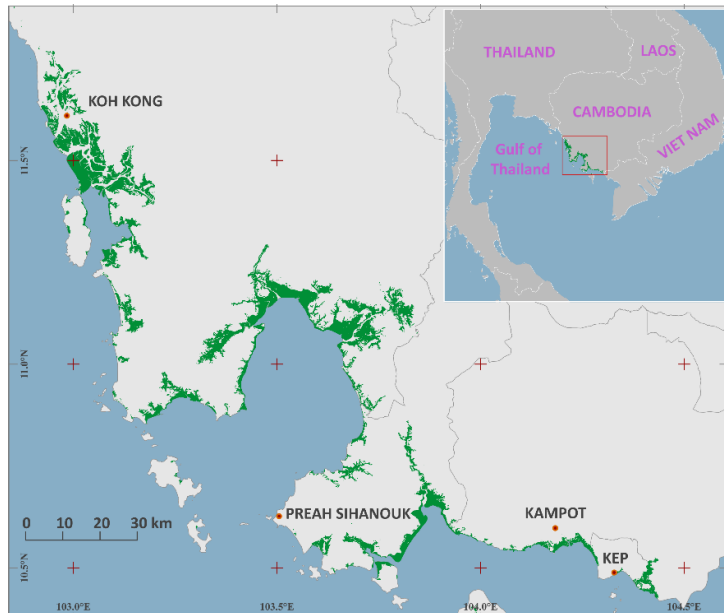
## 2. Research methods

This study used existing secondary data that includes datasets, reports, journal articles, legal frameworks and policy documents of the government of Cambodia, Thailand and Indonesia, NGOs and IOs to address the research questions. We also relied on the Global Mangrove Watch (2020)'s database, the FAO (2007)'s dataset, the analysis of Veettil and Quang (2019), the data of Pumijumnong (2014) and analysis of Arifanti et al (2022) to synthesize the information on the trend of mangrove forest loss in the three countries.

In addition, this study also reviewed news reports on mangrove conflicts and violations to document the forms of mangrove tenure conflicts and violations across the three countries. These were extracted from the Phnom Penh Post, Khmer Time News, Bangkok Post, Phuket News, Mekong Eye, and Mongabay published in the last 5-8 years. This study also relied on reports and fact sheets of Landesa, ActionAid Cambodia and the Cambodian Center for Human Rights for community tenure mangrove conflicts in Cambodia.

### 3. Cambodia

Cambodia shares the 435 km-long coastal border with Thailand and Vietnam at the northeastern shore of the Gulf of Thailand. The mangrove forests of Cambodia are situated along this coastal border located in four provinces (Koh Kong, Sihanoukville, Kampot and Kep). Koh Kong covers the largest area of mangroves (about 80%), followed by Sihanoukville (14%), Kampot (5%) and Kep (1%) [9].



**Figure 1: Geographical distribution of mangrove forests in Cambodia (data derived from Global Mangrove Watch 2022)**

#### 3.1 Trends of mangrove forest and drivers of loss

According to the Global Mangrove Watch, Cambodia stood at 7th in Southeast Asia as the country with the highest mangrove forest after Vietnam in 2020. Cambodia has 29 species of mangroves and none are considered threatened by the IUCN red list [10]. With different methodology, the extent of mangrove forests in Cambodia has been estimated differently by different studies. Our study used data sources that provide a long timeline to allow us to see the trends on mangrove loss. Therefore, we chose data from FAO (2007), Veettil and Quang (2019) and the Global Mangrove Watch (2020) for the analysis.

Based on the FAO's assessment (2007), Cambodia had 69,200 ha of mangrove forest in 2005. From 1980-2005, Cambodia had lost 22,000 ha or about 24% of the 1980 mangrove forest areas with the average loss rate of 880 ha or 1 percent per year [11].

Veettil and Quang (2019) used Landsat satellite data from the United States Geological Survey (USGS) to estimate mangrove loss more recently. They found that in Cambodia, 51,603 ha of mangrove forests remained in 2016-2017. From this study, Cambodia lost 36,810 ha (42% of the mangrove forests) between 1989 and 2016/2017 with the average loss rate of 1,315 ha per year [12]. According to the Ministry of Environment (2020), the coverage of mangrove area increased to 57,053 ha in 2018 [13].



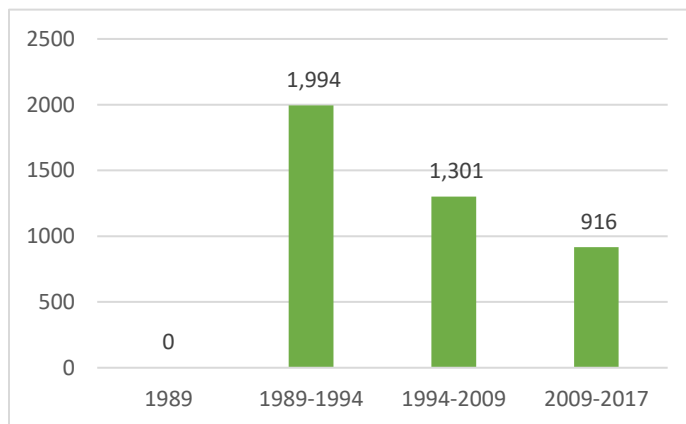
The latest data from the Global Mangrove Watch showed that in 2020 Cambodia had 62,691.88 ha of mangrove forest, of which 40,502 ha (65%) was found in protected areas<sup>1</sup>. According to the Global Mangrove Watch, from 1996-2020, Cambodia lost 1,963.89 ha or 3% of its 1996 mangrove areas with the average loss rate of 82 ha per year [10].

**Table 1: Mangroves areas and average loss rate per year in Cambodia from different sources**

Reference	Mangrove areas		Average loss rate/year	
	Year	Area (ha)	Timeline	ha
FAO (2007)	2005	69,200	1980-2005	880
Veettil and Quang (2019)	2016/2017	51,603	1989-2016/2017	1,315
MoE (2020)	2018	57,053	n.a.	n.a.
Global Mangrove Watch 2020	2020	62,691	1996-2020	82

The analysis of both Veettil and Quang (2019) and Global Mangrove Watch similarly suggest that the trend of mangrove forest loss in Cambodia has slowed down in the last decade, from which we may infer that the mangrove forests in Cambodia are experiencing an improving trend [12].

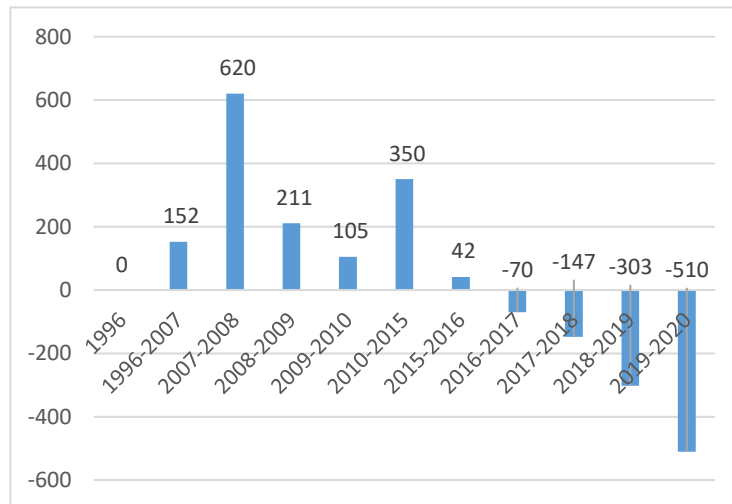
According to Veettil and Quang (2019), a large loss of mangrove forests in Cambodia occurred between 1989-1994 at 9,968 ha with average loss rate of 1,994 ha per year. This rate had then slowed down somewhat between 1994-2009, in which 19,511 ha of mangroves were cleared with the average loss rate of 1,301 ha per year. The loss rate continued to drop significantly between 2009-2017, when 7,331 ha of mangroves were cleared with the average loss rate of only 916 ha per year [12].



**Figure 2: Average loss rate of mangroves per year (ha) from 1980-2017 (data derived from Veettil and Quang 2019)**

<sup>1</sup> This represents the proportion of mangroves known to occur within protected areas. The level and the effectiveness of protection of these mangroves however are unknown.

Likewise, the Global Mangrove Watch found the annual loss rate of mangroves in Cambodia has increased from 152 ha per year between 1996 and 2007 to 620 ha per year between 2007-2008, but then it dropped to 42 ha between 2015-2016. Since 2016-2017, the annual rate of mangrove loss was minus indicating that the country had gained back some mangrove forest from 70 ha in 2016-2017 to 510 ha in 2019-2020 [10].



**Figure 3: Annual loss rate of mangroves (ha) from 1996-2020 (data derived from Global Mangrove Watch 2022)**

This improving trend may be due to mangrove rehabilitation and protection efforts. This finding corresponded with the findings of Su (2021) who evaluated the mangrove forests land cover changes and the degree of fragmentation in Kompong Som Bay of Cambodia from 2015 to 2020. Su (2021) found there was a gain of mangrove forests and this could be the result of mangrove restoration efforts in the country [14].

There are several factors that drive mangrove loss in Cambodia. According to Veettil and Quang (2019), the major reduction of mangroves happened in Koh Kong which mainly occurred between 1994 and 2009. At the time, extensive shrimp farming and illegal exportation of charcoal to Thailand were responsible for this loss. The second largest loss of mangrove forests was found in Sihanoukville and this happened between 1994 and 2016/2017 that was caused by the rapid development of tourism-related infrastructures and migration of people from other provinces for agriculture and settlement [12]. The other main drivers identified by other studies were growing rice and oil palm, urbanization, land encroachment, seaport expansion/development and salt farming [14;15;16;17]. As several studies confirmed, human factors (e.g., mangrove conversion for agriculture and aquaculture, infrastructure development and settlement) remained the dominant cause of mangrove loss in Cambodia. Goldberg et al. (2020) found natural factors such as extreme weather and erosion also become new drivers of loss that require attention [18].

**Table 2: Drivers of mangrove loss in Cambodia as identified in the literature from 1989-2020**

Year	Reference	Driver of mangrove loss
1989-2017	Veettil and Quang (2019)	Salt farming, charcoal production, shrimp farming, rapid development of tourism-related infrastructure
2000-2012	Fauzi and others (2019)	Aquaculture, agriculture and other human activities
2000-2012	Richards and Friess (2016)	Aquaculture, rice and oil palm, urbanisation
1992-2011	MoE (2019)	Land encroachment for agriculture, charcoal production, sea port expansion/development, salt and shrimp farming, unregulated coastal development and human settlements and poverty
2000-2016	Goldberg et al. (2020)	Five drivers to mangrove loss such as commodities <sup>2</sup> , settlements, non-productive conversion, extreme weather events and erosion
2015-2020	Su (2021)	Human activities such as urban development and rice cultivation

### 3.2 Types of mangrove tenure conflicts and violations

For some background information we reviewed articles from the Phnom Penh Post and Khmer Times News and the reports of ActionAid Cambodia published from 2017-2021 in relation to mangrove tenure conflicts and violations in Cambodia. A number of conflict and violation cases were identified (See Table 1 in the Annex). These ranged from small to large cases involving a few local households to hundreds of households, and companies.

From the review, mangrove tenure conflicts and violations in Cambodia mainly happened on state-own public land, protected areas or community fisheries land. The conflicts mostly occurred in Koh Kong and Kampot, followed by Kep and Sihanoukville. These conflicts and violations occurred in several forms. For example [19, 20, 21, 22,23, 24, 25, 26, 27, 28]:

- (i) Local villagers encroaching on public mangrove areas by building fences or clearing mangrove forests to access land to sell in response to rising land prices;
- (ii) Villagers cleared mangrove forests in protected areas and then sold to external traders at a low price;
- (iii) A development project cleared communal mangrove to build infrastructure such as roads;
- (iv) Persons whose mangrove land titles had already been annulled by the government continued clearing mangrove forests on prohibited land.
- (v) Investment companies occupied coastal areas that overlapped with communal land to develop recreational areas which could possibly cause environmental impacts.

<sup>2</sup> Commodities refer to activities that involve a combination of rice, shrimp, and oil palm cultivation [18]

### 3.3 Mangrove governance, existing legal frameworks, policies and stakeholders involved

According to the Strategic Planning Framework for Fisheries update for 2015-2024 of the Ministry of Agriculture, Forestry and Fisheries of Cambodia, Cambodia recognizes the strong link between sustainable fishery resources and mangroves and sees the need to conserve and reforest mangroves to ensure sustainable coastal ecosystems for future generations. Underlying this initiative, Cambodia has adopted a number of legal frameworks and policies to govern mangroves in the country [29].

#### **Existing legal frameworks and policies relevant to mangroves:**

The Law on Environmental Protection and Natural Resource Management, of the Ministry of Environment enacted in 1996 aims to ensure the sustainable preservation, development, management and the use of the natural resources of the Kingdom of Cambodia. This law does not specify mangroves, but mentions natural resources in its definition referring to “land, water, airspace, air, geology, ecological systems, mines, energy, petroleum and gas, rocks and sand, precious stones, forests and forest products, wildlife, fish, [and] aquatic resources”. This law also seeks to assess the environmental impacts of all proposed projects prior to the issuance of a decision by the Royal Government to prevent, reduce or control any negative impacts on the environment [30].

The Law on Fisheries adopted in 2006 provides a more specific description on mangrove protection. According to this law, mangroves are part of fishery resources. This law prohibits any activities that could damage, disturb or destroy growth of sea grass or coral reefs including mangroves. The Ministry of Agriculture, Forestry and Fisheries (MAFF), particularly the Fishery Administration (FiA), is responsible for managing fishery resources including the mangrove resources located in flooded areas which are attached to the fishing areas [31].

The Law on Fisheries also divides the management responsibility for mangroves with the Ministry of Environment (MoE) [31]. Since most of the mangroves (65%) in Cambodia have been designated within two protected areas (the Peam Krasaop Wildlife Sanctuary and Botum Sakor National Park), under the Royal Decree Creation and Designation of Protected Areas' signed on November 1, 1993 by King Sihanouk, the Ministry of Environment (MoE) is in charge of managing these mangroves [32].

The Law on Natural Protected Areas promulgated in 2008 gives the jurisdiction for the management of protected areas to the MoE, and especially to the Nature Protection and Conservation Administration (NPCA) within the MoE. This law provides the framework for the management, conservation and development of protected areas, some of which also include fishery resources and mangroves. According to this law, activities that are harmful to protected areas including mangroves are prohibited and the NPCA takes action to investigate, control, and crackdown on these offences and, if necessary files a complaint to the court [33].

Land Law 2001 of the Ministry of Land Management, Urban Planning and Construction, determines the regime of ownership for immovable properties in Cambodia for the purpose of guaranteeing the rights of ownership and other rights related to immovable property. By

immovable properties, Article 2 of this law categorizes them into immovable property by nature, immovable property by purpose and immovable property by law<sup>3</sup>. This law does not mention mangrove tenure, but Article 15 defines “any property that has a natural origin, such as forests, courses of navigable or floatable water, natural lakes, banks of navigable and floatable rivers and seashores” as public property of the state and this property is inalienable. Therefore, mangrove could be classified as the state public properties [34].

Article 16, however, states that “when state public properties lose their public interest use, they can be listed as private properties of the state”. However, such declassification can only take place after the adoption of a law providing for declassification from the list of state public properties to the list of state private properties. [34]. To date, there were a number of Sub-decrees the government of Cambodia issued to reclassify state public properties and public entities into state private properties for various uses. Some examples of Sub-decrees that were linked to mangroves and coastal land are:

- Sub-decree No. 146, dated 2020, transferring 85.37 hectares of land, located in Prey Nob district, Preah Sihanouk province, from the state public land domain (forest area since 2002) into the state private domain, and thus enabling the current occupants of the said parcel to obtain ownership rights over part of it;
- Sub-decree No.107, dated 2020, transferring 9 hectares, 82 acres and 55 centimeters of land in Prey Nob district, Preah Sihanouk province, from the state public land domain (forest area since 2002) into the state private domain, and thus enabling the current occupants of the said parcel to obtain ownership rights over part of it;
- Sub-decree no. 108, dated 2020, transferring 76 hectares, 09 acres and 42 centimeters in Prey Nob district, Preah Sihanouk province, from the state public land domain (forest area since 2002) into the state private domain, and thus enabling the current occupants of the said parcel to obtain ownership rights over part of it;
- Sub-decree No. 202, dated 2020 transferring 25 hectares and 93 acres of land in Prey Nup District, Preah Sihanouk province, from the state public land domain (forest area since 2002) into the state private domain;

Mangroves in Cambodia can be found in five sectoral jurisdictions as follow [35]:

- Natural Protected Area (NPA)
- Community Protected Area (CPA)
- Community Fisheries (CF)
- Economic Land Concession (ELC)

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<sup>3</sup> Immovable property by nature means all natural grounds such as forest land, cleared land, land that is cultivated, fallow or uncultivated, land submerged by stagnant or running waters and constructions or improvements firmly affixed to a specific place created by man and not likely to be moved; immovable property by purpose means things fixed to the ground or incorporated into the constructions and which cannot be separated there from without damaging them or altering them, such as trees, decorative attachments, as well; and immovable property by law means all rights in rem over immovable and movable properties that are defined by law as immovable property [34].

- Special Economic Zone (SEZ)
- Private Land Title (PLT)

In addition to the laws stated above, other legislation and policies that are relevant to the protection of mangroves and mangrove tenure in coastal areas can be found in Table 3.

**Table 3: List of ministries, other legislation and policies relevant to mangroves**

<b>Ministries</b>	<b>Laws/Decrees and Sub-Decrees</b>
Ministry of Agriculture, Forestry and Fisheries	<ul style="list-style-type: none"> <li>▪ Fisheries Law 2006</li> <li>▪ Forestry Law 2002</li> <li>▪ Sub-decree No. 79 on Community Forestry 2003</li> <li>▪ Sub-decree No. 25 on Community Fisheries Management 2007</li> </ul>
Ministry of Economic and Finance	<ul style="list-style-type: none"> <li>▪ Sub-decree No. 146 on Economic Land Concessions 2005</li> <li>▪ Sub-decree No.148 on the Establishment and Management of the Special Economic Zone 2005</li> </ul>
Ministry of Environment	<ul style="list-style-type: none"> <li>▪ Law on Environmental Protection and Natural Resource Management 1996</li> <li>▪ Law on Natural Protected Areas 2008</li> <li>▪ Sub-decree on Water Pollution Control 1999</li> <li>▪ Sub-Decree on Solid Waste Management 1999</li> <li>▪ Sub-Decree on Environmental Impact Assessment 1999</li> <li>▪ Cambodia's Shoreline Management Strategy (2006)</li> <li>▪ Zoning guidelines for the protected areas in Cambodia</li> </ul>
Ministry of Land Management, Urban Planning and Construction	<ul style="list-style-type: none"> <li>▪ Land Law 2001</li> <li>▪ Law on the Amendment to the Law on Investment of the Kingdom of Cambodia 2003</li> </ul>
Ministry of Interior	<ul style="list-style-type: none"> <li>▪ Sub-decree No. 182 on the Functions and Structure of Municipal Administration</li> <li>▪ Sub-decree No. 184 on the Functions and Structure of District Administrations</li> </ul>
Ministry of Water Resources and Meteorology	<ul style="list-style-type: none"> <li>▪ Law on Water Resources Management 2007</li> </ul>
National Committee on Coastal Area Management and Development	<ul style="list-style-type: none"> <li>▪ Royal Decree promulgating the Establishment of the National Committee on Coastal Area Management and Development 2012</li> <li>▪ Sub-decree on Organization and Functioning of General Secretariat of National Committee On Coastal Area Management and Development 2012</li> </ul>
Royal Government of Cambodia	<ul style="list-style-type: none"> <li>▪ Circular No. 001 on Development of Cambodia Coastal Areas 2012</li> <li>▪ Circular No. 05 on Necessary Measures to Strengthen Natural Resource Management 2016</li> <li>▪ Cabinet Decision No. 45 on Regulations on Creation, Conservation and Supervision of Marine Resources (2013)</li> <li>▪ Cabinet Decision No. 127 on the Establishment of the National Committee for the Prevention and Suppression of Natural Resource Crimes</li> </ul>

**Legislative reforms relevant to mangroves:**

The Royal Government of Cambodia has conducted legislative reforms in the last seven years related to natural resources, in particular the mangrove forests. According to the Notification on the Outcome of the Plenary Session of the Council of Ministers on November 6, 2015, by Letter No. 1303, the National Committee for Sub-National Democratic Development (NCDDs) is leading the preparation of the draft amendment to the Fisheries Law, Forestry Law, and Natural Protected Area Law. The three final revised laws are guided by principles such as sustainable development, good governance, transparency and participation, precautionary approach, and regional and international cooperation. These principles reflect the regional and international commitments to sustainable management and conservation of natural resources.

In November 2017, the Ministry of Agriculture, Forestry, and Fisheries (MAFF) amended the Fisheries Law by changing Articles 6, 41, 42, 43, and 95. The amendment brought three significant changes that impacted the fisheries sector. Firstly, Fisheries Cantonments will be integrated into the Provincial Departments of Agriculture, Forestry, and Fisheries under a new legal article. Secondly, the classification of gear for commercial fishing activity, specifically medium and large-scale operations, will be revised. Thirdly, a new scheme for offenses and penalties (including the mangrove forests) will be introduced. The three draft laws have been thoroughly reviewed by the legal team, consisting of Ministry of Justice, Ministry of Interior, Ministry of Agriculture, Forestry and Fisheries, Ministry of Environment and National Committee for Sub-National Democratic Development, who have proposed a revised version that will be submitted to the Office of Council of Ministers and the National Assembly in 2024. The specific role of the Sub-National Administrations in managing natural resources, such as forests, mangrove forests, fisheries, and protected areas within their jurisdiction, will be defined by the sub-decrees based on these three laws. Furthermore, the three laws ensure proper management, conservation, and development of such resources by delegating specific tasks to the Sub-National Administrators.

Besides the three draft laws, the Royal Government of Cambodia is also working on a new draft land law. To date, the draft Land Law is in the process of having public consultations to consolidate inputs from different NGO networks to be submitted to the Ministry of Land Management, Urban Planning and Construction (MLMUPC) for consideration by early 2024.

Another piece of legislation relevant to mangroves was the Environment and Natural Resource Code. In June 2023, the Ministry of Environment (MoE) also successfully introduced the Environment and Natural Resource Code that consists of 12 books and 865 articles. The management of mangroves is stated under Book 4 on sustainable management of natural resources.

### **Community rights to mangroves**

In relation to community's rights to mangroves, this notion has been promoted since 1997 when the Participatory Management of Mangrove Resources (PMMR) was introduced into Cambodia for the first time [36]. The Laws on Fisheries in 2006 together with Sub-Decree No. 25 on the Community Fishery Management in 2007 (replaced 2005 Sub-decree No. 80 on Community Fisheries Management) issued by the Royal Government of Cambodia officially recognizes citizens' rights to form Community Fisheries (CFi) to manage fishery resources including mangroves, in their own areas [31; 37]. However, these two pieces of legislation were relatively weak in terms of protecting the rights of CFi. Articles 59 and 63 of the Law on Fisheries states that CFi could be formed by local citizens, but it can also be abolished by MAFF for public benefits if deemed so. Article 62 also says CFi have no rights to sell, exchange, hire, donate or divide the community fishing area [30]. Articles 10 and 11 of the Sub-Decree on the Community Fishery Management states CFi has the duty to manage and conserve fishery resources including mangroves and organize fishing activities, but it has no duty to suppress all fisheries violations. CFi has to cooperate with the Fisheries cantonments or request intervention by nearby competent authorities to suppress fisheries violations in their areas [37].

The Law on Natural Protected Areas also recognizes the rights of communities to access resources in protected areas. Article 22 of this law states that "the state recognizes and secures access to traditional uses, local customs, beliefs, and religions of the local communities, and indigenous ethnic minority groups residing within and adjacent to the protected areas. Access to traditional uses of natural resources and customary practices of local communities and indigenous ethnic minority groups on a family scale may be allowed within sustainable use zones and conservation zones..." This law also encourages the implementation of community protected area management inside the protected areas [32].

Due to the recent amendments to the existing laws by the Royal Government of Cambodia (e.g. Land Law, Fisheries Law, Forestry Law and Natural Protected Area Law), how community's rights to mangroves are affected by these amendments will be discussed in a separate legal analysis paper.

### **Inter-ministerial bodies to address mangrove governance**

Cambodia also has a number of inter-ministerial bodies who take part in mangrove governance. For instance, the National Steering Committee for Coastal Zone Management formed in 1997 under MoE is an inter-ministerial body that attempts to deal with the multi sectoral issues of coastal resource issues. This committee is comprised of the Minister of Environment (Chairman), Under Secretaries of State from the Ministry of Agricultural Forestry and Fisheries (Vice-chair), Ministry of Tourism, Industry Mines and Energy Public Works and Transport, Rural Development, Women's Affairs Planning, Council of Development for Cambodia, Governors of coastal provinces, and NGOs and related coastal project stakeholders are observers [17].

Another inter-ministerial body is the Commission on Monitoring and Assessing for Suppressing Encroachment into Mangrove land and coastal reclamation which was established in 2005. This



committee is responsible for taking measures to stop encroachment activities and replanting mangrove trees in historical mangrove areas. The Commission is made up of the Minister of Environment, and Secretaries of State of the Ministry of Interior; Land Management, Urban Planning and Construction; Tourism; Agriculture, Forestry and Fisheries; and governors of coastal provinces and municipalities [38].

In 2012, the National Committee on Coastal Area Management and Development was established. It is made up of a number of ministries including the Prime Minister as Honorable President, Minister of Land Management Urban Planning and Construction as President, Minister of Environment as Vice President and Minister of Tourism as Permanent Vice President. This Committee is responsible for managing and developing coastal areas in Cambodia in a sustainable and responsible manner [39].

In 2016, the National Committee for the Prevention and Suppression of Natural Resource Crimes (NCPSNRC) were established based on the cabinet's circular No. 05 on Necessary Measures to Strengthen Natural Resource Management 2016 and Cabinet Decision No. 127 on the Establishment of the National Committee for the Prevention and Suppression of Natural Resource Crimes 2016. This committee consists of the Royal Cambodian Armed Forces and Royal Gendarmerie of Cambodia, Cambodian National Police and National Border Police, Ministry of Environment, Ministry of Agriculture, Forestry and Fisheries and 25 capital/city/provincial governors. NCPSNRC has a duty to prevent and suppress natural resource crimes which include coastal and fishery resources, such as deforestation, timber transportation, illegal timber exports, wildlife capture and illegal wildlife exports, encroachment on state land, and illegal mining throughout the country.

### 3.4 Governance challenges

Cambodia has made progress in protecting mangroves with the involvement of different stakeholders across levels to deal with mangrove issues. However, previous studies have pointed to a number of institutional problems and tenure rights issues underlying mangrove governance in Cambodia that explain the reasons why mangrove tenure conflicts and violations are occurring in the country which leads to the loss of mangroves.

In the last decades Cambodia has seen the need for coastal development in order to meet the needs for economic growth, tourism and the population growth, for example, the recent investment project to develop and transform Preah Sihanouk Province into a Model Multi-purpose Special Economic Zone 2021-2038. Cambodia has also reclassified some state public coastal land to private ownership for investment. For instance, Economic Land Concessions have been considered as the greatest threat to tenure security in areas with mangroves as it involves mangrove clearance and land granted in excess of what is allowed for in the regulations. Some ELCs were granted within protected areas that affected community land ownership rights. In addition, Special Economic Zones although having proven to be highly successful for the economic development of the country, they have often led to land evictions and land conflicts with communities [35].

The challenge from ELC and SEZ is not only due to the lack of law enforcement surrounding ELCs and SEZs, but also the incomplete zoning of protected areas and the absence of community protection for mangrove land tenure [35]. Due to unclear zoning, some coastal lands transferred to private companies can overlap with community coastal land. Cambodia's legislation and policies recognize the community's rights to access mangroves, but in practice these rights may not be fully protected. [27; 28].

The decision to transfer some coastal land to private ownership did not properly take into account the views of local communities through a participatory process. For example, the case of mangrove tenure conflicts between Community Fishery's people and Projects in Kampot and Kep showed that local people were invited for meetings with the stakeholders, but their opinions may not have been considered. Environmental and Social Impacts Assessment of the projects was also carried out, but were not accepted by the local people as it did not reflect the actual impacts on the ground [28].

Also, there is a lack of information on development projects for local people and relevant stakeholders. A few cases have been identified where local people including local authorities were not informed of the project in their areas. For example, the case of land fill to mangrove areas for road building in Prek Thnout village, Prek Thnout commune, Teuk Chhou district, Kampot and another land fill with sand inside the Peam Krasaop Wildlife Century in Mondol Seima district, Koh Kong where local people and authorities were not informed of when the projects were approved and who implemented the projects [21; 22].

Furthermore, mandates and responsibilities among government agencies to deal with mangrove issues are overlapping. Responsibility for mangroves involves several ministries which makes the management complex. When it comes to mangrove exploitation, it is not clear which ministry should intervene [40].

The mangrove restoration program in Cambodia while popular, it appears to be less effective due to limited participation of CFI members in mangrove maintenance, limited technical knowledge on planting methodology and awareness of CFI committee members about fishery law, land tenure and institutional mandates and low leadership capacity. Data showed only 20 to 30 percent of replanted mangroves survived from the restoration program [23].

## 4. Thailand

Thailand has a 2,815 km-long coastal border, of which 1,878 km are on the Gulf of Thailand and 937 km on the Andaman Coast (Indian Ocean) [41]. Around 80 percent of Thailand's mangroves are situated on the Andaman Coast and the other 20 percent around the Gulf of Thailand [42]. The west coast of the southern region<sup>4</sup> has the largest mangroves (75%), followed by the east coast of the southern region<sup>5</sup> (12%), eastern region<sup>6</sup> (10%) and central region<sup>7</sup> (3%) [43].

### 4.1 Trend of mangroves and drivers of loss

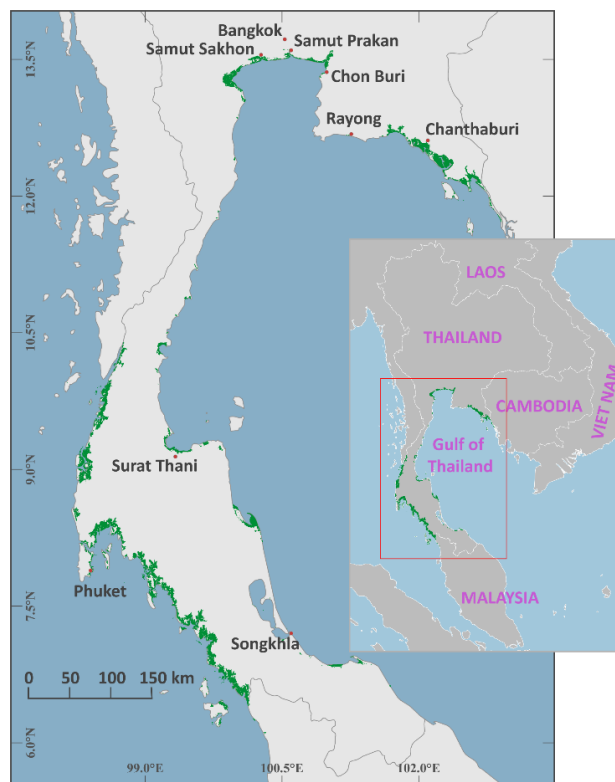
According to the Global Mangrove Watch, Thailand ranked 5th in Southeast Asia as the country with the highest number of mangroves after the Philippines in 2020. Thailand has 35 species of mangroves and two of them are considered threatened by the IUCN red list [10]. Data from the FAO (2007),

Pumijumnong (2014) and the Global Mangrove Watch (2020) have been used for the analysis.

According to FAO (2007), Thailand had 240,000 ha of mangroves in 2005. From 1980-2005, Thailand lost 40,000 ha or about 17% of the 1980 mangrove area with the average loss rate of 16,000 ha or 5.7 percent per year [11].

Pumijumnong (2014) found that in 2007 Thailand's remaining mangroves totaled 229,618.56 ha. According to this study, 38% (142,737.92 ha) of the mangroves in Thailand were cleared between 1961 and 2007 with the average loss rate of 3,103 ha per year [43].

The latest data from the Global Mangrove Watch estimated that Thailand had 252,798.62 ha of mangroves in 2020, of which 15,894 ha (6.29%) were found in protected areas<sup>8</sup>. From 1996-2020,



**Figure 4: Geographical distribution of mangrove forest in Thailand (data derived from Global Mangrove Watch 2022)**

<sup>4</sup> The west coast of southern region consists of Ranong, Phang Nga, Phuket, Krabi and Trang.

<sup>5</sup> The east coast of southern region consists of Chumphon, Surat Thani, Sakhon Si Thammarat, Phatthanlung, Songkla, Pattani and Narathiwat

<sup>6</sup> The eastern region includes Trat, Chantaburi, Rayong, Chonburi and Chachoeng Sao

<sup>7</sup> The central region includes Samut Prakarn, Bangkok, Samut Sakorn, Samut Songkhram, Phetchaburi and Prachuab Khiri Khan

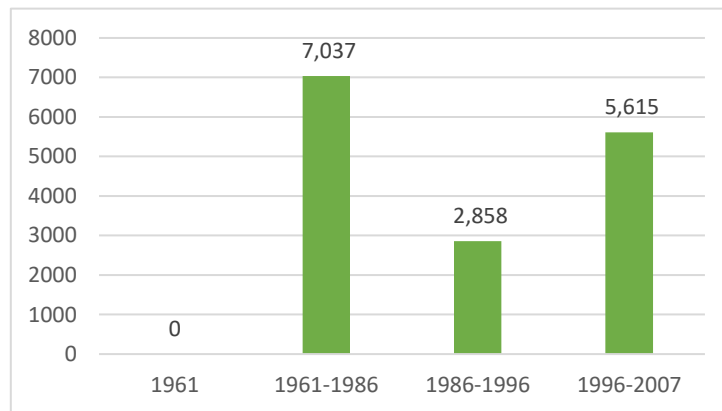
<sup>8</sup> This represents the proportion of mangroves known to occur within protected areas. The level and the effectiveness of protection of these mangroves however are unknown.

Thailand lost 7,020 ha or 2.7 % of its 1996 mangrove areas with the average loss rate of 293 ha per year [10].

**Table 4: Area of mangroves and average loss rate per year in Thailand from different sources**

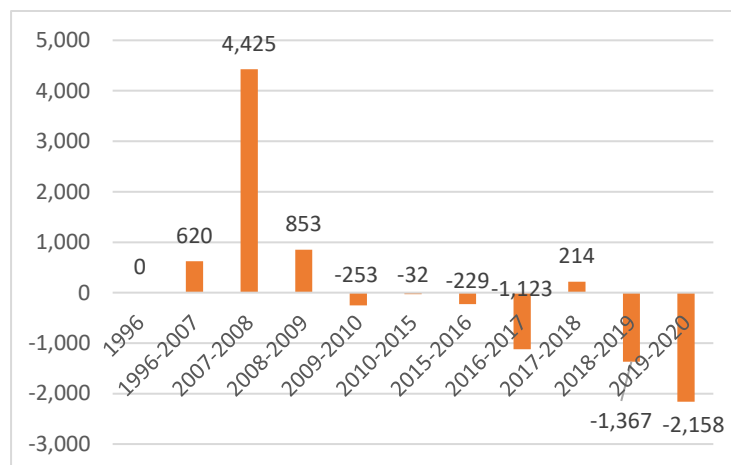
Reference	Mangrove areas		Average loss rate/year	
	Year	Area (ha)	Timeline	ha
Pumijumnong (2014)	2007	229,618.56	1961-2007	3,103
FAO (2007)	2005	240,000	1980-2005	1,600
Global Mangrove Watch 2020	2020	252,798.62	1996-2020	293

The analysis of Pumijumnong (2014) showed the fluctuation of mangroves status in Thailand that inferred that the situation was unstable between 1961-2007. For example, Pumijumnong (2014) found the major reduction of mangrove forest in Thailand occurred over the period 1961-1986 when 175,921 ha (47%) were cleared with an average loss rate of 7,037 ha per year. In the period, the main loss of mangrove was found in the west coast of the southern region, the eastern region, the east coast of the southern region and the central region. The rate of mangrove loss then slowed down to 28,582 ha between 1986-1996 with the average loss rate of 2,858 ha per year, before it increased to 61,765 ha in 1996-2007 with the average loss rate of 5,615 ha per year [43].



**Figure 5: Average loss rate of mangroves per year (ha) from 1961-2007 (data derived from Pumijumnong 2014)**

On the other hand, Global Mangrove Watch found that there has been a positive trend for mangroves in Thailand especially between 2009-2020. The annual loss rate of mangroves in Thailand had increased from 620 ha between 1996-2007 to 4,425 ha in 2007-2008, but dropped to negative between 2009-2020 indicating the country had gained back some mangroves [10] which according to Ei Win, H. (2018), might be the result of the conservation and rehabilitation in the country [44].



**Figure 6: Annual loss rate of mangroves (ha) from 1996-2020 (data derived from Global Mangrove Watch 2022)**

In Thailand, the loss of mangrove from 1961-1996 was mainly driven by shrimp aquaculture. Mangrove conversion for commercial shrimp aquaculture began as early as 1974, but the boom for intensive shrimp farming took off in 1985 when there was a high demand for shrimps in Japan [45]. Other drivers were charcoal concessions, infrastructure development and urbanization. Goldberg et al. (2020) identified human factors such as land conversions and settlement were the main drivers. Besides that, extreme weather events and erosion also, to some extent, contributed to mangrove losses in Thailand [18].

**Table 5: Drivers of mangrove loss in Thailand as identified by literature from 1961-2016**

Year	Reference	Drivers of mangrove loss
1961-1996	IUCN, 2020	56% of mangrove was cleared due to shrimp and salt farms
1961-2007	Pumijumnong (2014)	Charcoal, shrimp farming, urban expansion, pier and road construction, agriculture
2000-2012	Fauzi and others (2019)	Aquaculture, agriculture and other human activities
2000-2012	Richards and Friess (2015)	Aquaculture, rice and oil palm, urbanisation
2000-2016	Goldberg et al. (2020)	Five drivers of mangrove loss were commodities, settlements, non-productive conversion, extreme weather events and erosion

## 4.2 Forms of mangrove tenure conflicts and violations

We reviewed articles from the Bangkok Post, Phuket News and Mekong Eye published from 2016-2023 in relation to mangrove tenure conflicts and violation in Thailand. A number of conflict and violation cases were identified (See Table 2 in the Annex). Similar to Cambodian cases, we found that mangrove tenure conflicts and violations in Thailand mainly happened on state-owned public land, protected areas, reserved forest and community land. The conflicts mostly occurred

in Phuket. These conflicts and violations occurred in several forms. For example [46, 47, 48, 49, 50, 51],

- (i) Local villagers or the public encroached on public mangrove areas by building houses, growing plants or turning public mangrove areas into aquatic farms for business and tourism;
- (ii) Land ownership documents were illegally issued for protected mangroves and forest reserves areas;
- (iii) Investment companies developed activities on a coastal bay for recreational areas and a water channel for local transportation. These developments received low support from the community as local people believe they will cause potential impacts on whole food chain and will not give a fair share of benefits to the people.

#### 4.3 Mangrove governance, existing legal frameworks, policies and stakeholders involved

The 11th National Economic and Social Development Plan (NESDP) (2012-2016) of Thailand clearly recognizes the importance of mangroves not just to sustain coastal community livelihoods, but also to achieve marine security in the country (e.g., preventing the country from natural disasters and coastal erosion). This policy was targeted to conserve and restore mangroves in the country by achieving “at least 5,000 rai [800 ha] per year of mangrove coastal reforestation” [52]. In the 12th NESDP (2017–2021), Thailand enlarged the reforestation areas for mangroves from 1.53 to 1.58 million rai – an increase of 8,000 ha over five years. This new target came from a national goal to achieve “the proportion of land under forest... [at] 40% of the country in order to underpin a balanced ecological system” [53].

In addition, Thailand has established a number of legal frameworks and policies to govern and manage mangrove forests. Even though Thailand did not have laws that specifically applied to mangroves, mangroves are classified as forest, therefore forestry laws such as the Forest Act B.E. 2484 adopted in 1941 and the National Park Act 2504 B.E. in 1961 could be applied to mangroves [54]. The closest law dealing with mangroves is the National Reserved Forest Act (2507 B.E.) adopted in 1964. It seeks to prohibit any activities that lead to any damage to national reserved forests including mangroves that are considered as a national reserved forest. This law assigned the national reserved forest committee to take responsibility for the management tasks related to mangroves [55].

In 1987, the Government of Thailand adopted a zoning policy for mangroves and as a result, it declared 65% of mangrove areas as conservation zones with the remaining 35% as development zones that required rehabilitation and restoration. At that the time, the Royal Forest Department (RFD) was assigned for managing mangroves [56]. Later in 1991, His Royal Highness King Rama 9 first declared 10 May of each year as the “National Mangrove Forest Day” [57]. This was followed by a resolution passed by the government in 1991 to prohibit shrimp farming and tin mining in fertile mangrove areas in Thailand [56].

Another law that addresses mangroves directly is the Marine and Coastal Resources Management Act, B.E. 2558 (MCRM) of 2015. Section 18 of this law states that “the minister with the approval of the council and national marine and coastal management plan is able to enact ministerial regulations to determine specific mangroves areas to be preserved as mangrove areas in order to preserve and restore the area to maintain its fertile natural condition, environment and ecosystem. However, the area must not already be included in a national park area or wildlife sanctuary or nonhunting area or owned or possessed by anyone.” [58]

Other laws relevant to mangrove are:

- Wildlife Reservation and Protection Act 1992 (2535 B.E.), covering wildlife sanctuaries and non-hunting areas;
- Commercial Forest Plantation Act 1992 (2535 B.E.);
- Decentralization Act 1999 (2542 B.E.);
- Promotion and Conservation of National Environmental Quality Act, B.E. 2535 (A.D.1992) with revised version B.E. 2561 (A.D. 2018)
- Land Code 1954 (2497 B.E.)

Thailand also established a number of policies with respect to mangrove rehabilitation, education and training and mangrove research. The mangrove rehabilitation policy began in June 1991. At that time, the Thai Cabinet allocated approximately 450 million baht to rehabilitate 40,000 ha of mangrove forest areas from 1992-1996. Later, the mangrove rehabilitation program started engaging the private sector and communities in the implementation of restoration initiatives with the focus on mangrove habitat restoration, livelihood, capacity building, policy planning, education and knowledge sharing. The Thai Government also invested in promoting public participation and a public campaign for mangrove rehabilitation and conservation. The government also engaged various agencies including academic institutions and international organizations to participate in mangrove research [59].

In Thailand, mangrove governance involves multiple entities. Since 2002 the Department of Marine and Coastal Resources (DMCR) under the Ministry of Natural Resources and Environment, was assigned to manage mangroves following the Marine and Coastal Resources Management Act, B.E. 2558 adopted in 2015. This Act assigned DMCR, (which was previously the responsibility of RFD), to take charge of managing mangroves outside national parks and naval areas including mangrove in conservation zones and those in reserved forests. DMCR is mandated to implement government mangrove policy and regulatory oversight. It has a central office in Bangkok, six regional offices, and 45 Mangrove Management Units (MMUs) responsible for mangrove monitoring and law enforcement, mangrove conservation and planting, and local education on the importance of mangroves [54].

For mangrove forests inside the protected areas, according to the MCRM Act, they are under the responsibility of the Department of National Parks, Wildlife and Plant Conservation (DNP), within MoNRE. However, for mangroves within naval bases, the responsibility is assigned to the Royal Thai Navy [54].

Thailand also has a National Committee on Marine and Coastal Resource Management Policy and Planning (NCMCRMP), established by the MCRM Act. It is in charge of preparing and monitoring implementation of a national policy and national plan on marine and coastal resource management, approving new mangrove conservation areas, which may only be set up outside national parks, wildlife sanctuaries, non-hunting areas and privately owned land. This Committee consists of the Prime Minister, Minister of MoNRE, permanent secretaries of all relevant ministries, and at least 12 'qualified members' appointed by the Council of Ministers. Under the National Committee, Provincial Committees are to be established that include the provincial governor, representatives of relevant departments and at least eight qualified representatives of civil society or coastal communities appointed by the provincial governor [54].

In relation to mangrove tenure, according to the Forest Act 1941, all forests including mangroves are state-owned. In Thailand, the majority of mangrove forests are owned by the government and are reserved as national reserved forest. Human settlement and mangrove utilization for private use in the areas are prohibited. People could still enter the forest, but they cannot own or exploit it without a license or permission issued by MoNRE. "Those with claims to land in areas subsequently classified as a Mangrove Conservation Zone can claim compensation but must relocate unless permission is issued by the Director-General of the DMCR, in which case the maximum period of residence is 30 years. While the private sector and households can own forest plantations and agroforests which they establish, issuance of land titles for forest land is prohibited" [54, p. 18].

Similarly, according to the National Park Act 1961, only the government can own and legally possess land in a national park, and this also includes mangroves. The amended Land Code 1954 of Thailand also mentions private land ownership under the Department of Land within the Ministry of Interior [54]. According to this Land Code, there are various types of private land certificates, ranging from i) *Sor Kor Nong (S.K.1)* referring to a notification form of possession with little real rights associated with it (generally for farming); ii) *Nor Sor Song (N.S.2)* referring to a consent letter issued by the land department to the holder to occupy and use the land for a temporary period of time; iii) *Nor Sor Saam (N.S.3)* referring to a title deed which shows a person's right to possess a certain plot of land, but the land borders must be confirmed with neighboring plots; and iv) *Nor Sor Si (4) Jor (or Chanote)* referring to a certificate of true ownership for land. These private land certificates could be relevant to mangrove areas [60].

For community's rights to use mangrove forests, both the 1997 and the 2007 Thai constitutions recognize the community's rights to natural resource management within their territories [52]. Similarly, the 11th and 12th National Economic and Social Development Plan (NESDP) also highlights the important roles of community empowerment in natural resource management. However, the rights of the community to natural resources (including mangrove forests) was only officially recognized in legislation in Thailand in 2019 after the Community Forest Act B.E. 2562 came into effect. It took three decades before the Act was finally adopted due to several revisions and changes over the content [61].



The Community Forest Bill seeks to provide the right of communities to participate in the conservation, rehabilitation, management, maintenance or use of natural resources, the environment and biodiversity. However, these activities must be carried out in cooperation with the government. The Act also identifies the main activities that can be carried out by community forest members. They can [61]:

- Enter the community forest for recreation
- Earn benefits from products and services, such as collecting forest products and using timber and other resources for normal household use or for public activities
- Use the forest for educational and awareness-raising purposes

Community forest members are prohibited from doing the following activities:

- Residing in, or making a living from it
- Clearing, burning, mining, hunting protected animals or degrading the forest
- Using timber beyond subsistence household or community use
- Constructing buildings, unless it is necessary for community forestry activities, such as a fire lookout towers

#### 4.4 Governance challenges

Thailand has showed improvement in mangrove conservation and restoration. As data showed, the coverage of mangrove forests in Thailand has increased and this has also been confirmed by the satellite data provided by the Geo-Informatics and Space Technology Development Agency (Gistda) which works with the Department of Marine and Coastal Resources (DMCR) of Thailand [61]. Despite the positive trend in mangrove coverage, past experiences in mangrove governance in Thailand showed both lessons learned and key challenges that explain ongoing mangrove encroachment in the country.

In the past, many studies (e.g., Sathirathai and Barbier 2001; On-prom, 2014) have argued that the loss of mangrove forests in Thailand was mainly driven by the centralized system and that authority and responsibility for mangrove management rested with the government and there was limited public and local participation in mangrove management. In fact, the community has the capacity to guard and protect mangroves if their rights are formally recognized and enforced by law [63; 64]. In this regard, in 2019, the Community Forest Bill was endorsed in Thailand to legitimize community's rights. In spite of progress in promoting community's rights over mangroves, there still remains gaps and ambiguity with Thailand's legislation around land titling and use and this still contributes to the continuing land encroachment on mangrove forests areas. According to GEF Small Grant Program (2021), because the government of Thailand recognized various forms of land titling, some forms of land titling such as *Sor Kor Nong (S.K.1)* have been identified as the critical cause of mangrove deforestation because they often involved false claims over land ownership and seizure of state land or forests [65].

Another challenge in mangrove governance was due to policy flaws and lack of coordination among government agencies involved [56]. For example, Huitric et al. (2002) found that in the 1990s, the Department of Fisheries under the Ministry of Agriculture and Cooperatives issued

the Fisheries Act 1991 to ban the use of mangroves for shrimp farms, but in 1996 the same ministry lifted the ban on logging and shrimp farming in order to promote development in the country. Similarly in 1997, while the Royal Forestry Department which was under the Ministry of Agriculture and Cooperatives declared its plan to replant mangrove forests, the Department of Fisheries which was under the same ministry declared that it would promote expansion of the shrimp industry through the leasing of remaining mangrove areas [66]. This showed how the decisions of government agencies can contradict each other and lacked coordination.

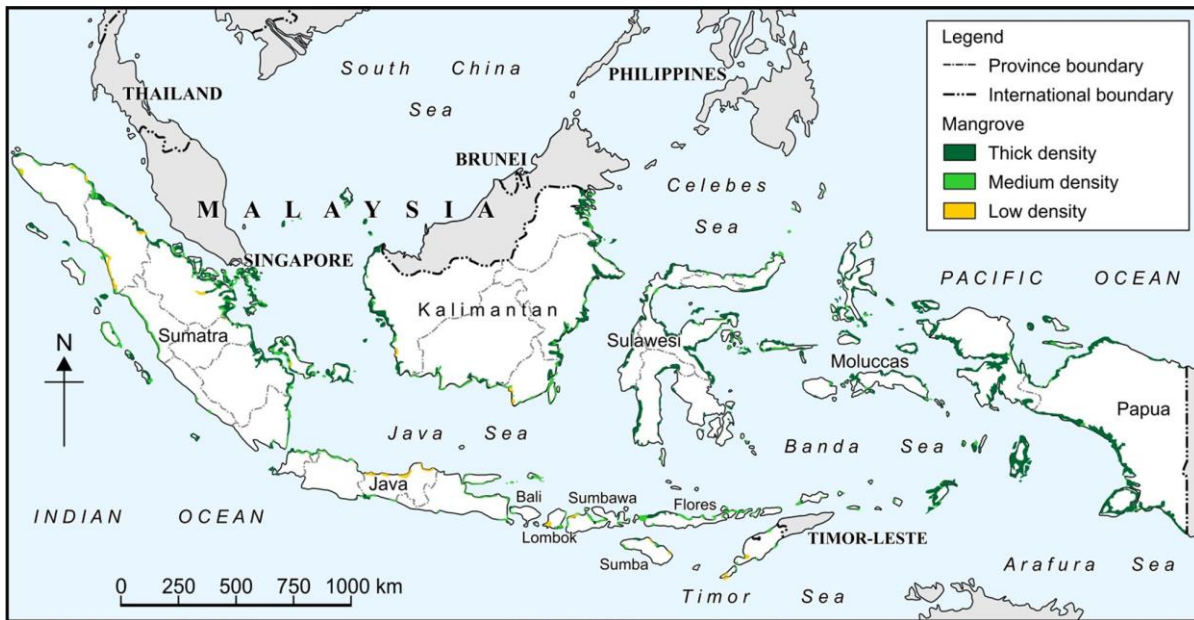
Policy flaws were also found in mangrove restoration initiatives. For example, Thompson (2018), found in response to the 'Get Back Forest' policy, the government had urged the Department of Marine and Coastal Resources to plant mangroves on coastal areas. However, this caused tension between the Department of Marine and Coastal Resources and evicted communities such as fish farmers and charcoals producers who reclaimed the areas for livelihoods [67].

Another issue is how to balance land use and conservation of the environment. The government of Thailand faced constraints in resolving ongoing land conflicts and landlessness with communities. Thai communities with support from human rights groups and NGOs had advocated for land rights for a long time. It was not until 2020, that Thai authorities agreed landless Thai community people in the coastal town of Ranong, including indigenous people such as the sea gypsies could settle in protected mangrove areas with the condition that those people must help protect the mangrove forests. This authorization did not provide ownership rights to the community, but people can build homes and live in the areas under the monitoring of the government. While the government received appreciation from the public for this action, at the same time it faced challenges in prioritizing mangrove forests for conservation purposes [70].

Lastly, even though Thailand had been recognized as the country that restored many mangroves, studies found that the efforts often failed due to policy failure, lack of budget and limited capacity afforded to the agencies tasked to enact the policy [67]. According to Memon and Chandio (2011), most of the mangrove restoration initiatives did not take into account the principles of ecological restoration and often focused on a single type of mangrove plantation. Also, the DMCR which is responsible for the restoration received limited budget to fulfil its roles causing this department to rely on financial assistance from the private sector through corporate social responsibility (CSR). This could affect the autonomy of DMCR to decide how, where, and when mangrove rehabilitation should be implemented, hence leading to the low survival rate of mangroves [56].

## 5. Indonesia

Indonesia has an extremely long coastline of 95,181 km with more than 17,504 islands between the Pacific and the Indian Oceans (DKP DKI Jakarta, 2009). Mangrove forests are distributed along the coastline mainly on the five big islands: Jawa, Sumatra, Kalimantan, Sulawesi and Papua [71].



**Figure 7: Geographical distribution of mangrove forest in Indonesia (Miller & Tonoto 2023) [72]**

### 5.1 Mangrove forests and drivers of loss

According to Global Mangrove Watch, Indonesia ranked 1st in Southeast Asia and has one fifth of the global mangrove total in 2020. It has 47 species of mangroves and five of them are considered threatened on the IUCN red list [10].

FAO's assessment (2007) showed Indonesia had 2.9 million ha of mangrove forests in 2005. From 1980-2005, Indonesia lost 1.3 million ha or 31% with the average loss rate of 52,000 ha or 1.24 percent per year. The major reduction of mangrove forest occurred between 1980-1990 when 0.7 million ha were cleared with the average loss rate at 1.8% per year [11].

Another study by Arifanti et al (2022) provided more recent analysis on mangrove deforestation in Indonesia. It found that Mangrove deforestation in Indonesia from 2009-2019 totaled 182,091 ha with the average loss rate of 18,209 ha per year. Kalimantan and Sumatra were the two regions with the highest mangrove loss with mangrove deforestation rates of 6,850 ha per year and 5,832 ha per year respectively from 2009-2019. The other areas of mangrove loss were Kepulauan Bali Nusa Tenggara and Kepulauan Maluku. Papua and Java were the regions with the lowest mangrove deforestation in the same period [73].

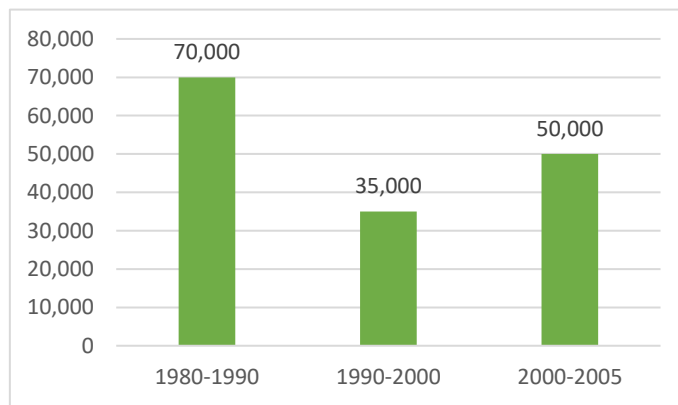
The latest data from Global Mangrove Watch estimated that Indonesia had 2,953,398.42 ha of mangrove forests in 2020, of which 734,320 ha (25%) was found in protected areas<sup>9</sup>. From 1996-2020, Indonesia lost 173,904 ha with the average loss rate of 7,246 ha per year [10].

<sup>9</sup> This represents the proportion of mangroves known to occur within protected areas. The level and the effectiveness of protection of these mangroves however are unknown.

**Table 6: Area of mangroves and annual loss rate in Indonesia from different sources**

Reference	Mangrove areas		Average loss rate/year	
	Year	Area (ha)	Timeline	ha
FAO (2007)	2005	2 900 000	1980-2005	52,000
Arifanti et al (2021)	n.a	n.a	2009-2019	18,209
Global Mangrove Watch 2020	2020	2,953,398.42	1996-2020	7,246

The data from FAO (2007) showed the decline of the rate of loss in mangroves from 1980 to 2005. The average loss rate of mangrove dropped from 70,000 ha per year between 1980-1990 to 35,000 ha per year between 1990-2000, but rose slightly to 50,000 ha per year between 2000-2005 [11].

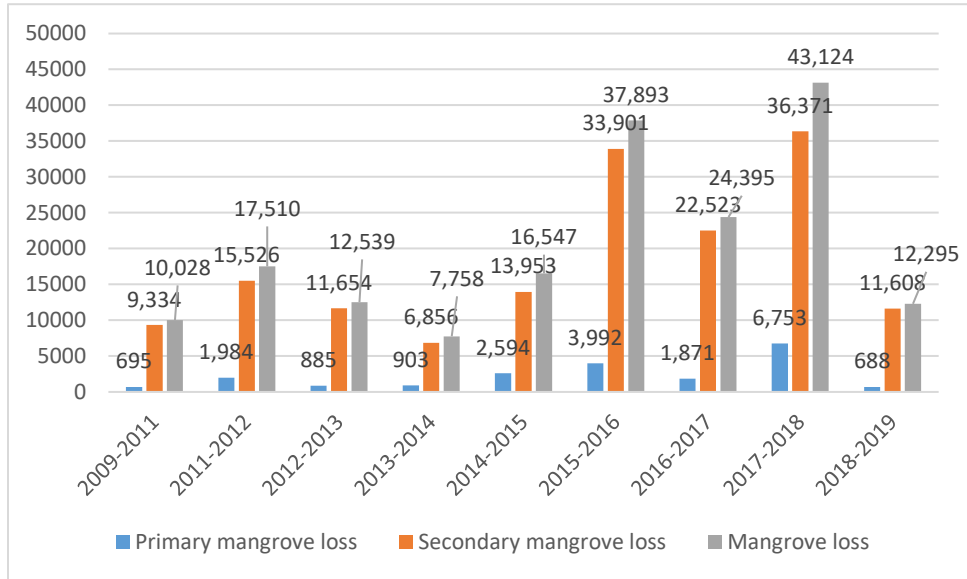


**Figure 8: Annual loss rate of mangroves (ha) from 1980-2005 (data derived from FAO 2007)**

Arifanti et al (2022) provided the analysis on mangrove loss between 2009-2019. They categorized two types of mangrove forests: primary<sup>10</sup> and secondary<sup>11</sup>. Arifanti et al (2022) found that the rate of annual mangrove loss in Indonesia between 2009-2019 significantly dropped compared to 1980-2005 as found by FAO (2007). The rate of mangrove loss was only 10,028 ha per year between 2009-2011 before it rose to 37,893 ha in 2015-2016 and 43,124 ha in 2017-2018. The highest mangrove loss occurred in secondary mangroves, about eight times higher than primary mangroves. The major loss of both primary and secondary mangroves happened in 2017-2018 when 6,753 ha and 36,371 ha respectively were cleared. However, the rate of mangrove loss of both primary and secondary mangrove had substantially dropped in 2018-2019 indicating some improvement in mangrove conservation in Indonesia [73].

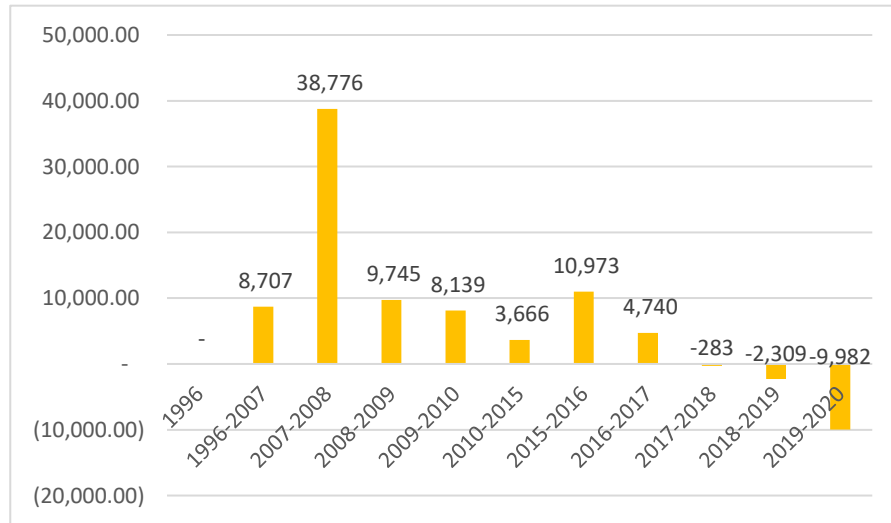
<sup>10</sup> Primary mangroves refer to dense or undisturbed mangroves that are often found in conservation areas [73].

<sup>11</sup> Secondary mangroves refer to disturbed or less dense mangroves often derived from primary mangrove conversion [73].



The **Figure 9: Annual loss rate of mangroves (ha) from 2009-2019 (data derived from Arifanti et al 2022)**

data from Global Mangrove Watch showed otherwise and that the major loss of mangrove forest in Indonesia occurred in 2007-2008 with the annual loss rate of 38,776 ha. It also showed the annual loss rate of mangrove in Indonesia had dropped from 38,776 ha in 2007-2008 to 9,745 ha in 2008-2009 and continued to drop to 4,740 ha in 2016-2017. The rate of mangrove loss in Indonesia turned negative from 2017 to 2020, indicating that Indonesia had gained back some



**Figure 10: Annual change rate of mangroves (ha) from 1996-2020 (data derived from Global Mangrove Watch 2022)**

mangrove forest in the country [10].

Despite different data from FAO (2007), Arifanti et al (2022) and Global Mangrove Watch, they shared the same conclusion that the rate of mangrove loss in Indonesia had significantly declined over the last two decades. This indicates positive changes in the status of mangroves in Indonesia [10; 11; 73].

Ilman et al (2016) found that the main driver of mangrove loss in Indonesia in the 1970s was mangrove timber harvesting due to government policies to boost timber production. Then, the expansion of aquaculture triggered by the increased shrimp price during the Asian financial crisis in 1997 led to more mangrove deforestation in the 1980s, especially in Kalimantan, Sumatra and Sulawesi [73;74]. Other drivers included agriculture such as the development of palm oil plantations in Sumatra and Kalimantan [16], and also infrastructure development, settlement, urbanization, industrialization and pollution [18; 75]. Both Goldberg et al (2020) and Bhowmik et al (2022) emphasized natural/environmental drivers such as climate change (referring to sea-level rise, temperature, and precipitation changes) and extreme events became strong factors in driving mangrove loss in Indonesia [18;75].

**Table 7: Drivers of mangrove loss in Indonesia as identified in the literature from 1960s-2020**

Year	Reference	Drivers of mangrove loss
1960s-1990s	Ilman et al. (2016)	Aquaculture (called <i>tambak</i> ), timber production and palm oil plantation
2000-2012	Fauzi and others (2019)	Agriculture, aquaculture, infrastructure, and other human activities
2000-2012	Richards and Friess (2015)	Aquaculture, rice, and oil palm
2000-2016	Goldberg et al. (2020)	Commodities, nonproductive conversion (e.g., coal mining), settlements, non-productive conversion, extreme weather events and erosion
2009-2019	Arifanti et al. (2022)	Aquaculture contributes about 36% to mangrove deforestation in Indonesia
1990-2020	Bhowmik et al. (2022)	Aquaculture, agriculture, climate change, settlement and urbanization, extreme events, industrialization, and pollution

## 5.2 Forms of mangrove tenure conflicts and violations

Conflict over the control of mangrove forests occurs in the form of overlapping claims on state forests among stakeholders such as indigenous peoples and local communities who have benefited from accessing the mangrove forests for years, as well as licensed companies which are located in forest areas with business permits [76].

Mangrove tenure conflicts arise due to various people’s perceptions and interpretations of their access and ownership rights to forest land and resources, depending on the stakeholders involved [76]. The main causes of land tenure conflicts originated from various claims of interest by the stakeholders involved due to the lack of clarity, legitimacy, and legality of land tenure policies [76]. Some articles from Mongabay News were reviewed to identify forms of mangrove conflicts within Indonesia which are available in Table 3 of the Annex [77, 78, 79, 80].

### 5.3 Existing legal frameworks, policies and stakeholders involved

Home to one fifth of global mangrove forests, Indonesia put strong efforts into restoring mangroves. The goal of restoring is more than to protect coastal livelihoods and its coasts from natural disasters, but to achieve the country's ambitious plan to use more of its land and forest sectors to absorb carbon from the atmosphere by 2030, a significant contribution to climate change mitigation. In its National Mangrove Program, Indonesia proposed to rehabilitate 600,000 hectares of degraded mangroves by 2024 and enhance conservation of existing mangroves [81].

The governance of mangroves in Indonesia involves two sectors (i) forestry and (ii) the fishery and marine/coastal sector and therefore regulations to govern mangroves often relates to these two sectors. The regulations that serve as the basis for mangrove conservation were the 1960 basic agrarian law [82]; Law No. 5 of 1990 on the Conservation of Biological Natural Resources and their Ecosystems [83]; the regulations of the Presidential decree No.32 of 1990 on the management of Protection Areas, [84]; and Law No.41 on forestry adopted in 1999 [83].

Other regulations include government regulation No. 45 of 2004 regarding forest protection that is linked to the 1999 forestry law [85] and ministerial decree No. 201 of 2004 that sets out standard criteria and guidelines for dealing with mangrove damage [85].

Law No. 27/2007, which was amended into Law no. 1/2014, on the Management of Coastal Zone and Small Islands, that allowed logging practices in mangrove areas that adhere to the sustainability of coastal ecological functions and assigned the Ministry of Marine Affairs and Fisheries (MMAF) to sustainably manage mangroves in coastal areas and small islands [83]. This Law also defines the authorities and responsibilities between central and local governments and regulates community participation and empowerment regarding customary rights, obligations, engagement, complaints, objections, and compensation [82].

Due to multiple bodies involved in mangrove governance, since 2012 the central government of Indonesia began to promote coordination among government agencies by stipulating in Presidential Decree No. 73 in 2012 on the National Strategy for Mangrove Ecosystem Management that specifically suggested having a National Coordinating Team for Mangrove Ecosystem Management composed of the MoEF, MoMAF, and Ministry of Agrarian and Spatial Planning (MMASP) to manage mangrove eco-systems as protected areas or cultivation areas and formulate norms, standards, procedures, and criteria [82;86].

However, in early 2020, Indonesia enacted Presidential Regulation No. 82 to dissolve this National Coordinating Team for Mangrove Ecosystem Management and issued Decree No. 89/2020 to establish a new Strategic Coordinating Team for Wetland Management. The importance of this new regulation is to streamline the country's efforts to meet its international Sustainable Development Goals (SDGs) and Low Carbon Development, leading to protection of Indonesia's mangroves and the achievement of the country's Nationally Determined Contributions report to address climate change [86].

Indonesia has issued many diverse laws, policies, and regulations to govern mangrove forests under the management of different government agencies namely the Ministry of Environment and Forestry (MOEF), Ministry of Marine Affairs and Fisheries (MMAF), the Ministry of Agrarian and Spatial Planning Affairs/National Land Agency (MASPPA-NLA), and Ministry of National Development Planning (MNDP) including local and provincial governments [82;83].

The MOEF has the main authority for mangrove protection located in state forest areas (both mainland and maritime), while MMAF is responsible for mangrove protection outside the state forest areas (coastal and small island areas) [82]. MASPPA-NLA is accountable for tenure rights enforcement and spatial planning development in the mangrove zones and MNDP for preparing the national strategy for mangrove ecosystem management [82].

Mangroves are also regulated by provincial, district and village governments at the lower levels [82]. In 2014, Law No. 23 on regional government (regional autonomy) was approved to shift the authority for mangrove forests under the state forest zone from the district forestry agency to the provincial forestry agency [82].

Community's rights in mangrove management has been regulated under Article 18 of Act No. 27 of 2007, which was amended into Law no. 1/2014. The existence of indigenous peoples who have used the coast from generation to generation must be respected and protected as regulated in Article 61 paragraph (1) of Act No. 27 of 2007 [82].

Law No. 32 on environmental protection and management announced in 2009 defines the process and standards for community participation, environmental safeguards, and environmental conservation. This law provides communities with the support of customary rights, financing, conservation participation, sustainable use and management of mangrove forest landscape, and multiple uses of mangroves in terms of ecological integrity, human well-being, and biodiversity conservation [82].

Presidential Decree No. 73 of 2012 also pays attention to community-based management and highlights the responsibilities and authority of local governments as well as empathizing the importance of research, science, and technology for sustainable mangrove management [82].

#### **5.4 Governance challenges**

Based on data from the 2020 Statistics on Marine and Coastal Resources report, only about one-third of Indonesia's mangrove forest with an area of 788,496 ha are in good condition [87]. This is due to numerous issues that worsened Indonesia's mangrove conditions and the challenges that still exists are as follows.

The governance of mangroves falls under four different government authorities. This multiplicity of institutional frameworks, regulations, and laws as well as fragmented sectoral authorities can cause overlapping governmental jurisdiction and coordination challenges across the line ministries [82].



Also, contradicting policies and legislation are another factor that can contribute to mangrove clearance. For example, the rehabilitation plans of the government that clashed with the government's own plan to continue its land reclamation in a number of areas. For instance, the reclamation of 85 ha of the Bali coastline for port facilities polluted Benoa Bay and destroyed the vegetation in a 17 ha mangrove forest [88]. Also, the 2020 job creation law known as omnibus law, article 5 deals with creating jobs from thermal resources, that legalize geothermal mining in waterborne areas that also caused concerns over mangrove destruction [89].

Another aspect for consideration is that mangrove forests in Indonesia are divided into at least five different tenure and management regimes namely; as national parks, large-scale concessions, community-government territory, state forest zones under the central government's ownership, and areas under local government management [82]. The last three of the above-mentioned tenure and management regimes provide local communities with rights and management responsibilities [82], but these tenure rights are often lower than community forestry rights which had a stronger set of formally recognized rights for about 35 years [87].

Besides security of tenure rights of communities' mangrove forests, mangrove restoration and conservation require willingness, commitment and engagement of local communities who have concrete benefits for their daily livelihood with efforts to participate in environmental protection [88]. On the other hand, the lack of community ownership in the rehabilitation program and locals' resistance has impeded the government-tightened regulations on restoration [79]. Therefore, strengthening the resilience of coastal communities with alternative livelihoods for their economy, as well other incentive mechanisms to boost their productivity in protecting and restoring Indonesia's green belt can be a priority for the government agenda [90;88].

Another obstacle to mangrove conservation is mangrove seedling planting. It is important for the government to focus on technical, best practices and knowledge sharing on successful mangrove restoration including specific conditions of the areas to be restored, quality of seedlings and management procedures as well as monitoring for correct planting practices [88, 91].

Finally, climate change including rising sea levels, sinking land, and more intense storms are still inhibiting Indonesia's mangrove restoration because of the massive destruction of the protective belt of mangrove forest along the coastline [92].

## 6. Discussion

Cambodia, Thailand and Indonesia share some similar approaches in protecting and restoring mangroves but prioritize their objectives differently. Cambodia with a small mangrove coverage plans to conserve mangroves in pursuit of a sustainable coastal ecosystem [29]. Thailand also wants to conserve mangroves to protect coastal resources but prioritizes natural disaster prevention and coastal erosion after the country faced a tsunami in 2004 [52]. Indonesia, that has the largest area of mangroves in the region and in the world committed to mangrove conservation to achieve carbon sinks by 2030 as set out in the global climate change agenda [81].

From the three case studies, it can be seen that each country strives to govern mangrove despite different priorities. This ranges from mechanisms to stop mangrove loss to efforts to restore and replant mangroves in devastated areas. Despite such efforts, commitments to incorporating mangroves into permanent forms of protection through protected areas is still limited. Statistics showed that the mangrove coverage under protected areas were still small in Thailand (6.29%) and Indonesia (25%) [10]. Based on the Global Mangrove Alliance, classifying mangroves into protected areas is important because it could prevent further loss of mangroves. The permanent forms of protection may include not only government designated protected areas, but also other effective area-based conservation measures or any community, indigenous lands and areas of sustainable use where mangroves are protected from clearing and conversion [10].

Putting mangroves into protected areas is not enough. The case of Cambodia showed that while 65% of total mangroves are situated in protected areas, the country still lost many mangroves due to illegal clearance and reclassification of protected areas into Economic Land Concessions or Special Economic Zones. More enforcement of laws and clear tenure rights could help to resolve this issue which will be discussed later [21,24].

This paper also found that Thailand and Cambodia have taken a clear approach by classifying mangrove as a single resource sector i.e., mangroves as forest for Thailand [54] and mangroves as fishery resources for Cambodia [31] compared to Indonesia that considered mangrove as terrestrial and marine resources [86]. However, due to the ambiguous position of mangroves situated between the land and sea, the status of mangroves governance remains complex in the three countries [82].

First, it is complex in the way that mangrove clearance is often associated with economic development priorities of each country due to the potential for mangrove areas being developed for commercial ports, shrimp aquaculture, agriculture, real estate, resorts and so forth. For instance, the paper found mangrove clearance was associated with resort projects for Cambodia [28,29]; oil palm plantation, port building and geothermal mining for Indonesia [89]; or real estate development for Thailand [50,51]. These are the major underlying factors leading to mangrove devastation in the three countries. To restore mangroves, these underlying factors should be addressed [94].

Second, mangrove governance is complex because it involves various intersectoral bodies that include forestry, fishery, land, coastal, marine resources and protected areas. These government bodies often have overlapping mandates and policies that conflict with each other due to their different priorities and interests [39,82]. According to Kanika Sanjiv Sood et al. (2022), in this case, clarifying governmental authority is important to help increase accountability and minimize the risk for conflicting regulations between sectors [95].

In Cambodia, Thailand and Indonesia, it was also seen that the efforts of the governments to address this issue was by establishing multi-sectoral bodies to coordinate the work among

sectors [39,53,86]. However, in practice, the functions of these bodies are still constrained due to low budget and lack of linking mechanisms across sectors and levels of government [56,82,90].

According to Banjade et al. (2017), to ensure effective multisectoral coordination work, there is a need for budget support, a clear implementation plan that could identify priorities for coordination and specific mechanisms for coordination. There is also a need to assess constraints as the reason why the coordination among sectors fails and whether emerging opportunities are available for strengthening cross sectoral collaboration in mangrove conservation [82].

Effective governance of mangroves also requires fair and effective laws. This means that the laws and policies should be clearly defined, are consistent with human rights considering the situation of indigenous people, local communities, women and all vulnerable, marginalized and/or minority groups and incorporate the principles of environmental sustainability [8]. Based on the three case studies, it was found that the three countries have developed several laws, policies and regulations to govern mangroves, but there remain flaws and inconsistencies in these especially in Thailand and Indonesia, that require harmonization [56, 89]. In Cambodia, there are still legislative gaps in the national laws, especially the Land Law and Law on Fisheries to protect and facilitate the legitimate rights of Community Fisheries to their fishing grounds and surrounding lands [28]. In addition, according to CCHR, the two laws did not align well with international soft laws such as the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security and the Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication [29].

Unclear tenure for mangroves was another driver of mangrove conflicts and evictions in the three countries. Despite having tenure regulations, it was still found that mangrove conflicts in the three countries revolved around having various claims of ownership by actors to own the same mangrove areas, leading to tensions which points to the issue of unclear mangrove tenure in the three countries. To address this issue, there is a need for strengthening mangrove tenure and tenure rights through revisiting and redefining the relevant existing laws and regulations to realign them to support mangrove conservation [96].

Even though it was found that most of the mangroves are already under the tenure authority of government, there is more recognition that government-led mangrove protection efforts alone are not effective enough due to inadequate personnel, limited capacities of responsible departments and budgets of the government [97]. Therefore, the trend to shape mangrove governance with the use of inclusive models of community-based management or co-management through devolved tenure arrangements to communities became popular across the three countries. Likewise, drawing experiences from India, Vietnam, Liberia, Tanzania, Philippines, Fiji and Australia, Kanika Sanjiv Sood et al. (2022) also confirmed that returning control over mangroves to communities is effective to help restore and preserve mangrove ecosystems [95].

The degree of devolvement of mangrove tenure rights in communities still varied by country. Thailand seemed to show high commitment to community tenure rights through its efforts to adopt the Community Forest Act B.E. 2562 in 2019. Cambodia and Indonesia, though not having a separate law on community tenure rights, have embedded community rights into their existing legal frameworks, such as the Fishery Law, the sub-degree on the Community Fishery Management, the Land Law and the Law on Natural Protected Areas for Cambodia and for Indonesia, it is Law no.1/2014 on the Management of Coastal Zone and Small Islands, Law No. 32 on environmental protection and management and Presidential Decree No. 73.

Embedding community tenure rights into the existing laws and regulations indicates the extent to which community rights have been recognized by the governments, but in practice these rights may still not be well enforced. In this context, access to justice and conflict resolution is important. Communities should be aware of their natural resource-related rights and the avenues available to them for resolving conflicts or seeking redress. They should be able to seek and obtain support for grievances and resolve their conflicts [8].

Findings from previous studies across the three countries showed that natural factors such as sea level rise and erosion are becoming important drivers of mangrove loss in the region. Strategies could be developed in response to these factors to build mangrove resilience by identifying degraded areas for restoration and rehabilitation programs. These strategies have already been implemented in Indonesia and Thailand. Such strategies could be incorporated into protected areas design or into integrated coastal management programs [98].

Indonesia and Thailand shared a long history of implementing restoration programs for mangroves, which can provide lessons learned to Cambodia to implement similar approaches. Their experience showed that mangrove restoration could fail if it involved inappropriate mangrove planting program(s), i.e., mono species plantation or lack of maintenance [55, 87, 90]. Also, based on Thailand's experience, the fact that the restoration program depends on external funding agencies could affect the autonomy of internal institutions to decide how, where, and when mangrove rehabilitation should be implemented, therefore leading to low survival rate of mangroves [56].

The literature also suggested that an effective restoration program for mangroves still requires a clear mangrove tenure arrangement. As noted by Lovelock et al. (2019), mangroves cannot be planted on lands that are not owned by anyone because mangrove planting requires persistent monitoring and maintenance [99]. Having clear mangrove tenure is important for this to encourage users to invest in protecting mangrove seedlings in their areas. From the experience of Indonesia, comparing different tenure regimes, community-controlled areas are considered as the most secure and effective, to help manage, protect and rehabilitate mangroves [82]. Some additional factors that contribute to the success of community-based mangrove rehabilitation, include strong, committed local leadership, knowledge and technology, external support and availability of resources, participation and collective action and government's coordination across sectors and to make sure the community benefits from mangrove conservation [82].

## 7. Conclusion and Lessons Learned

This paper points out that natural factors have gradually emerged as a contributor to mangrove loss, but systematic problems in mangrove governance remain the key driver that must be addressed. Drawing from the experiences of Cambodia, Thailand and Indonesia, the commonalities of governance issues shared by the three countries that drive mangrove loss and conflicts include unclear land tenure and land use planning to support mangrove conservation, weak law enforcement, overlapping government jurisdictions and regulations on mangrove management, ineffective cross-sectoral coordination, and limited community participation. A number of lessons learned could be drawn from this paper for effective conservation of mangroves in the region.

- In countries where mangrove coverage under protected areas remains small, incorporating more mangrove areas into protected areas is a necessary measure to support mangrove conservation. The permanent forms of protection may include not only government designated protected areas, but also other effective communities, indigenous lands and areas of sustainable use where mangroves are protected from clearing and conversion;
- Incorporating mangroves into protected areas may not contribute to mangrove conservation if zoning of protected areas is not clear or there is a lack of law enforcement. Therefore, working to complete zoning of protected areas that have mangroves, making sure ELCs are not inside protected areas or overlap with the boundary of CPAs and promoting law enforcement are necessary measures to conserve mangroves in protected areas.
- Another important aspect to sustain mangroves is to strengthen security of mangrove land tenure and land use planning. Secure mangrove tenure allows people to invest in protecting and restoring mangrove ecosystems in their areas, however, it could also lead to negative effects depending on the forms of tenure taking place and how it is used. Indeed, the government needs to promote coastal development to meet the actual need for economic growth. However, granting mangrove tenure for large-scale investment project (e.g. ELC) that are identified as threats to local communities should be avoided or the appropriate environmental impact assessment should be conducted beforehand with consultation with the community.
- Compared to the tenure authority of government, effective mangrove conservation and restoration still rests on the models of community-based management and customary rights. Therefore, returning the control of mangroves to communities to manage and rehabilitate them could be considered. However, communities also need a support system to do this work, meaning that it is important to make sure their rights to mangroves is legally recognized and protected in legislation; community people are able to access justice and conflict resolution regarding their mangrove land; stakeholders need to provide support to communities through strengthening local leadership, providing

support on technology and resources, promoting local participation and livelihoods and ensuring effective government coordination in support of communities;

- While countries may have already adopted laws and policies to govern mangrove tenure rights (i.e., forestry laws, fishery laws, protected area laws, coastal laws, natural resource management laws or land laws), overlapping regulations remain. Therefore, there is a need to revisit the existing laws to realign them and clarify government's authority across sectors to make sure that the existing laws promote clear mangrove land tenure and strengthen community or customary rights for sustainable mangrove conservation;
- Do to the effects of climate change, building mangrove resilience through mangrove restoration programs is important. Such strategies need to be incorporated into the design of protected areas and into integrated coastal management of a country. In order to have a successful program, there is a need to focus on the appropriate selection of mangrove species for planting, the hydrological works to control tidal flows for mangroves, engagement of the community for mangrove maintenance, and sustainable funding and autonomy of internal institutions to decide how, where, and when mangrove rehabilitation should be implemented.

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## Annex

The information in the tables below provides specific geographical cases of mangrove tenure conflicts across the three countries. However, this is for general background information and not to be taken as verified information.

**Table 1: Cases of mangrove tenure conflicts or violations in Cambodia from 2017-2022**

No	Mangrove conflicts/violation	Year	Location	Background information on the case	Sources
1	Continuance of mangrove clearance on areas where land titles have been reclaimed by the government	2017	Sihanoukville, Kep, Kampot and Koh Kong	There was a continuation of mangrove clearance practices on annulled mangrove land. In June 2016 the Council of Ministers issued a directive to annul land titles granted for more than 300 hectares of filled-in mangrove swamps in Preah Sihanouk, Kep, Kampot and Koh Kong provinces, after the Ministry of Agriculture reported their harmful environmental impact.	Phnom Penh Post [18]
2	Mangrove clearance for development	2018	Mondul Seima district, Koh Kong	Concerns have been raised over the clearing of mangrove forests along Bak Khlong beach in Koh Kong province's Mondul Seima district as land prices in the area increased.	Phnom Penh Post [19]
3	Mangrove fill with sand inside the Peam Krasaop Wildlife Sanctuary	2018	Mondol Seima district, Koh Kong	Sand dredging and filling of a mangrove forest in Peam Krasaop Wildlife Sanctuary is being investigated. The 2 hectares filled in are part of a more than 1,000-hectare "community zone" – a protected area where residents can still live and cultivate the land – inside the wildlife sanctuary.	Phnom Penh Post [20]
4	Land fill to mangrove areas for road building	2020	Prek Thnout village, Prek Thnout commune, Teuk Chhou district, Kampot	The mangrove forests and swamps located near the Prek Tnong fishing community in Prek Thnout village, Prek Thnout commune, Teuk Chhou district, Kampot province are under threat as land fill has started again after the stop order was first issued	Khmer Times [21]

				on 18th of January 2020 by Kampot Fisheries Administrative officials. The land fill encroachment measured approximately 1,000 square meters.	
5	Meas Techo Sen Beach Resort, an artificial beach project	2020	Kampot	Kampot Provincial Administration in collaboration with a private investment company plans to establish Meas Techo Sen Beach Resort, an artificial beach with 234 hectares to encourage more tourists and the rapid development.	Landesa report [23]
6	Building fences and clearing mangrove in protected areas by villagers and brokers	2021	Chroy Svay commune, Sre Ambil Koh Kong	Mangrove forest in Chroy Svay commune have been encroached. It was believed there was an external trader who asked people to encroach on the state land and in return they would give money to them.	Phnom Penh Post [24]
7	Conflicts on mangrove land encroachment in Trapeang Chamkar Krom protected areas	2021	Trapeang Chamkar Krom commune, Koh Kong	Many hectares of mangrove forest in the Trapeang Chamkar Krom protected area of Koh Kong province were being encroached upon despite community efforts to patrol them. Some opportunists moved in and secretly cleared many hectares while authorities were occupied with the Covid-19 fight.	Phnom Penh Post [25]
8	Conflict on mangrove land grabbing between Community Fishery and private entity	2021-2022	Kampot and Kep	Two private projects occupied approximately 640 hectares and 3,910 hectares respectively overlapping with 7 community fisheries in both Kampot and Kep Provinces to develop recreational areas, golf areas, resorts, restaurants and others. Community people do not support both investment projects because it could potentially take away the benefit from fishery families whose daily life are based on those coastal resources.	ActionAid Cambodia report and CCHR Factsheet [26;27]



**Table 2: Cases of mangrove tenure conflicts or violations in Thailand from 2016-2023**

No	Mangrove conflicts/violation	Year	Location	Background information on the case	Sources
1	Phuket encroachment in parks	2016	Phuket	164 land ownership documents for more than 2,000 rai (320 ha) of protected mangroves and forest reserves in Phuket were suspected of being unlawful. A panel was formed in line with the cabinet's resolution to examine this issue	Bangkok Post [45]
2	Mangrove encroachment in Trat	2017	Trat	About 228 rai of mangrove land which had been encroached on by villagers and others had been retaken by the Marine and Coastal Resources Department	Bangkok Post [46]
3	Mangrove encroachment in Samut Songkhram	2020	Amphawa district, Samut Songkhram	More than 200 rai of fertile mangroves was seized from encroachers after it had been illegally occupied and turned into aquatic farms in Ban Ton Lam Pan in Amphawa district	Bangkok Post [47]
4	Mangrove encroachment at Klong Mudong	2022	Phuket	Local villagers of Makhum Khu community complained that people had invaded Klong Mudong mangrove area preventing them from making a living by fishing and catching crabs.	Phuket News [48]
5	Pristine bay in Phuket under threat from marina developers	2022	Ao Kung, Phuket	In 2018, a developer revealed a plan to develop a piece of land in Ao Kung for a marina and sports complex and submitted the plan for an Environmental Impact Assessment (EIA) study with Thai authorities. However, the developer retracted the EIA due to opposition from local conservation groups. In 2019, the development re-emerged in a different package – as two separate projects carried out by different entities. One was a marina and sports complex proposed by a landowner, who submitted a new EIA, which claimed the project would be less likely to destroy mangroves and coral reefs. Another plan was a 1.2-kilometer-long and two-	Mekong Eye [49]

				meter-deep water channel dredging project proposed by the Marine Department, which claimed it was necessary for the transportation of local boats.	
6	Illegal houses found encroaching on protected mangrove area	2023	Phuket	Protected mangroves in Soi Sorngkun area were encroached where new houses had been built with new crops planted on an area that has already seen eviction notices.	Phuket News [50]

**Table 3: Cases of mangrove tenure conflicts or violations in Indonesia 2020-2023**

<b>N°</b>	<b>Mangrove conflict/violation</b>	<b>Year</b>	<b>Location</b>	<b>Background information on the case</b>	<b>Sources</b>
1	Illegal clearance of mangrove land	2020	North Sumatra	Farmers accused a company of illegally clearing mangrove land	Mongabay News [76]
2	Illegal Tin mining affected mangrove forests, coral reefs, and local fisheries and provoked violations within indigenous and local communities	2020	Kelabat Bay in Bangka Belitung islands	Conflict appeared between community groups and artisanal small-scale Tin miners who were accused of illegal action within the government-restricted zone for traditional fisheries, mangrove conservation and tourism.	Mongabay News [77]
3	Mangrove illegal logging and encroachment	2022	Kun-Kun village	Illegal loggers cut mangrove for timber and fish farming including crab and shrimp fishing.	Mongabay News [78]
4	Mangrove illegal logging and encroachment	2022	Tanjung Panjang nature reserve of Sulawesi Island, Gorontalo	90% of the mangroves in the reserved areas have been illegally cut down to create shrimp and fish ponds due to inconsistent zoning.	Mongabay News [78]
5	Mangrove clearance for oil palm plantation	2023	East Tanjung Jabung district, Jambi province of Eastern Sumatra	Groups of smallholders sold their abandoned rice fields and coconut farmland submerged by brackish water to an intermediary. That patch of mangrove forest in eastern Sumatra was then cleared to make way for an oil palm plantation.	Mongabay News [79]