



Engaging customary law to improve the effectiveness of marine protected areas in Indonesia

Tyas Ismi Trialfhianty^{a,b,*}, Claire Helen Quinn^c, Maria Beger^{a,d}

^a School of Biology, Faculty of Biological Sciences, University of Leeds, Leeds, UK

^b Environmental Engineering, Faculty of Engineering, Universitas Pelita Bangsa, Indonesia

^c School of Earth and Environment, Faculty of Environment, University of Leeds, Leeds, UK

^d Centre for Biodiversity and Conservation Science, School of Biological Sciences, University of Queensland, Brisbane, Australia

ARTICLE INFO

Keywords:

Applied *adat* law

Conservation management

Perspective of *adat*

Integration of customary law management

Thematic analysis

ABSTRACT

Customary law has been acknowledged worldwide for its ability to increase the effectiveness of conservation projects such as Marine Protected Areas (MPAs). In Indonesia, the acknowledgement of customary law is clearly written in a decree formulated by the national government. However, our understanding of how customary law supports, interacts with, and complements conservation remains limited. Here, we explore the role of customary law in helping MPAs achieve their goals in Indonesia. We characterise how customary and formal regulatory conservation management intertwine when local communities manage their natural resources. We studied two MPAs located in the west (Sabang Island) and east (Nusa Penida Island) of Indonesia. There, we gathered both quantitative and qualitative data from a total of 360 respondents using questionnaires, in-depth interviews, and focus group discussions to investigate community knowledge of and perspectives on customary or *adat* law, the history of *adat* law and how it is currently applied, and the practise of both *adat* and formal regulatory conservation management. Our analysis assessed quantitative data using statistical analysis in R, and qualitative data with thematic analysis in NVivo. Most of our respondents were positive about the application of *adat* law to manage and protect the environment, thus customary law was found to be effective in supporting the goals of MPAs. However, our findings suggest that the full integration of customary law and formal regulatory conservation management can be difficult to achieve, as they rely on different principles for deciding policy and implementing sanctions. If integration is to be achieved, we suggest both systems need to be: (1) flexible; (2) widely communicated; and (3) clearly written.

Key terms used in this paper will aid in understanding various terms within the context of this research.

Terms	Meaning
<i>Adat</i> law/ customary law	Written and unwritten law decided through customary deliberations and agreed upon by all customary stakeholders; often influenced by outside ideas, policies, and knowledge
Indigenous law	Written and unwritten law decided through customary deliberations and agreed upon by all customary stakeholders; usually not influenced by outside ideas, policies, and knowledge
<i>Desa adat</i>	Customary village authorized to make customary laws. It is responsible for managing all matters related to religion, ceremonies and cultural activities.

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Terms	Meaning
<i>Desa dinas</i>	Official village in charge of administrative affairs. Under the umbrella of national law and directly responsible to the official state administration
<i>Awig-awig Pecalang</i>	Customary law produced by a customary village in Bali
<i>Pecalang segara</i>	Customary village authority's security forces responsible for marine related territory
<i>Panglima Laot</i>	Sea commander in Aceh; it refers to a man who has the authority to enforce customary law related to the sea. It can also be seen as an institution which has an organisational structure consisting of a chairman (<i>Panglima Laot</i> itself), vice chairman, secretary, treasurer and deputy

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* Corresponding author; School of Biology, Faculty of Biological Sciences, University of Leeds, Leeds, UK

E-mail address: tyasismi@pelitabangsa.ac.id (T.I. Trialfhianty).

<https://doi.org/10.1016/j.ocecoaman.2025.107543>

Received 3 August 2023; Received in revised form 22 December 2024; Accepted 7 January 2025

Available online 13 January 2025

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Terms	Meaning
<i>Musyawah</i>	A joint discussion with the intention of reaching a decision on problem solving; or negotiations; or deliberation
<i>Nyepi</i>	A Balinese one-day religious ritual dedicated to connecting to God through fasting, silence and meditation
<i>Nyepi segara</i>	A Balinese religious ritual by residents in Nusa Penida that involves not touching, crossing, or doing any activities in or on, the sea to give the sea a short break

1. Introduction

Customary and Indigenous laws and rules have helped people manage their environment and natural resource use for centuries. They are known for their advantages in resolving conflict between users (Campbell et al., 2012), supporting biodiversity conservation and protection (McClanahan et al., 2006; Gutiérrez et al., 2011), and having wide acceptance among local communities (Johannes, 2002). Similarly, in Indonesia, the governance of natural resources has relied on customary law, called ‘adat law’, since at least the 1200s (Abdullah et al., 2018). *Adat* law differs from Indigenous law in that it applies to a narrower set of situations and has changed over time through the influence of outside knowledge (Holleman, 2013), which makes *Adat* terminology in Indonesia hard to distinguish from one place to another. For instance, *Adat* in Java has close connection to festivities, homage and visits, while in Minangkabau, *Adat* refers to ‘law or binding rule of custom’ (Holleman, 2013). Indigenous law covers a wider range of circumstances and is less influenced by outside religious perspectives or external knowledge. *Adat* law is known by many names throughout the many islands that make up Indonesia. In the east, such as in Maluku, Papua, and Bali, *sasi* and *awig-awig* are the *adat* laws that have been used for centuries to help people manage their natural resources. These *adat* laws hold similar principles to modern fisheries management, and support species and coastal habitat protection and conservation (Harkes and Novaczek, 2002).

Marine protected areas (MPA) encompass ocean and coastal areas that are managed and protected with potentially several levels of protection, typically legalised by law or/and by other effective means to accomplish the long-term preservation of the natural world, along with the cultural values and related ecosystem services (IUCN, 2012). MPAs aim to sustainably protect and manage flora, fauna and cultural features such as wrecks and temples (Kelleher, 1999). MPAs are often managed locally because of the importance of their cultural, ecological, politic, socio-economic and institutional context for management effectiveness (Jones, 2002). However, this is not always the case (i.e. marine national parks), thus, the efficacy may be impaired (McClanahan et al., 2006). MPAs in Indonesia are classified and managed under a zoning system that allows and supports local coastal communities to access its marine and coastal resources sustainably. These MPAs are regulated by the Ministry of Environment and Forestry (MoEF) and the Ministry of Marine Affairs and Fisheries (MMAF). They usually contain several zones such as core zone, wilderness zone, rehabilitation zone, and tourism zone, limited use zone, sustainable fisheries zone (Lazuardi et al., 2020). Apart from the diverse tribes, religions, cultures and local languages in Indonesia, the country also has deep-rooted customary and traditional practices to manage marine and coastal resources, called customary management. The customary management or *adat* management of marine areas in Indonesia can be broadly categorised into zones for protection, certain types of permitted users, and sanctions (Estradivari et al., 2022).

The presence of *adat* law in Indonesia is important, because it often serves to combine the legal authority of local and national government with the ethics of local customs (Harkes and Novaczek, 2000). While *adat* rules and laws may have similar functions to more formal

regulatory conservation institutions, they also have advantages, including low-cost implementation and voluntary compliance in local communities (Colding and Folke, 2001). However, the question of whether conservation management through *adat* law can be combined with formal regulatory forms of management to achieve effective conservation is still pertinent. Integration challenges can arise because of tensions and conflicts between customary and formal regulatory forms of management. Thus, this study aims to explore the role of customary law in helping conservation projects, specifically marine protected areas (MPAs), achieve their goals. It is divided into several explorative steps, including (1) documenting customary law related to marine resources management and conservation; (2) understanding the way customary management and formal conservation management interact; and (3) understanding the contribution of customary law to MPA effectiveness.

2. Methods

2.1. Study area

This study was carried out in two MPAs, in the west (Sabang Island) and east (Nusa Penida Island) of Indonesia. Both Nusa Penida and Sabang MPAs were officially designated in 2014, when management was transferred from an NGO to local and national government control through the Ministry of Marine Affairs and Fisheries (MMAF). The MPAs are considered locally managed marine areas, which are described as ‘managed by the government with significant decentralization and influences from a private organization’ (Yunitawati and Clifton, 2021, p.3). Primary data on knowledge of and perspectives on customary or *adat* law, the history of *adat* law, and how it is currently applied, and the practise of both *adat* and formal regulatory conservation management were collected in six villages, three of them located in Nusa Penida, Bali, and three in Sabang, Aceh. We selected the village locations such that one village is located in the core zone of the MPA and the other two villages are located outside the core zone (Fig. 1). This design enabled a wide range of local community members from different socioeconomic backgrounds (e.g., differentiated by gender, education, etc.) in various types of MPA locations to be included.

2.2. Data collection and analysis

We collected a combination of qualitative and quantitative data using questionnaires, in-depth interviews, and focus group discussions. A total of 360 people participated in this study, selected using a combination of random sampling for the questionnaires and snowball sampling (Parker et al., 2019) for the in-depth key informant interviews and focus group discussions. Key informants included NGO staff, *adat* representatives of a village, official village representatives, and MPA managers employed by the government, who were all interviewed in person using a semi-structured approach. Participants in the focus group discussions included members of the local communities from groups concerned with MPAs and coral reef use and management, such as fishers, farmers, people who work in tourism (e.g., dive instructors), and people who work in local governance (both official and *adat*). Respondents for the questionnaire were chosen randomly from the study communities. We used a map of the village to select houses by choosing one house at random, then counted 3 to 5 houses to the left until the number of required respondents was achieved. In the questionnaire, we asked respondents about their knowledge of customary law in their area, its rules and sanctions, and whether they think the application of customary law is effective in supporting conservation projects. In contrast, for in-depth interviews and focus group discussions we explored more specific details about customary law, its history, management and issues, depending on the type of respondent participating. For example, for NGO respondents, we did not ask about the history of customary law, as this question was more suitable for the leader of the *adat* village authority, *Pecalang* or *Panglima Laot*. Instead, we asked

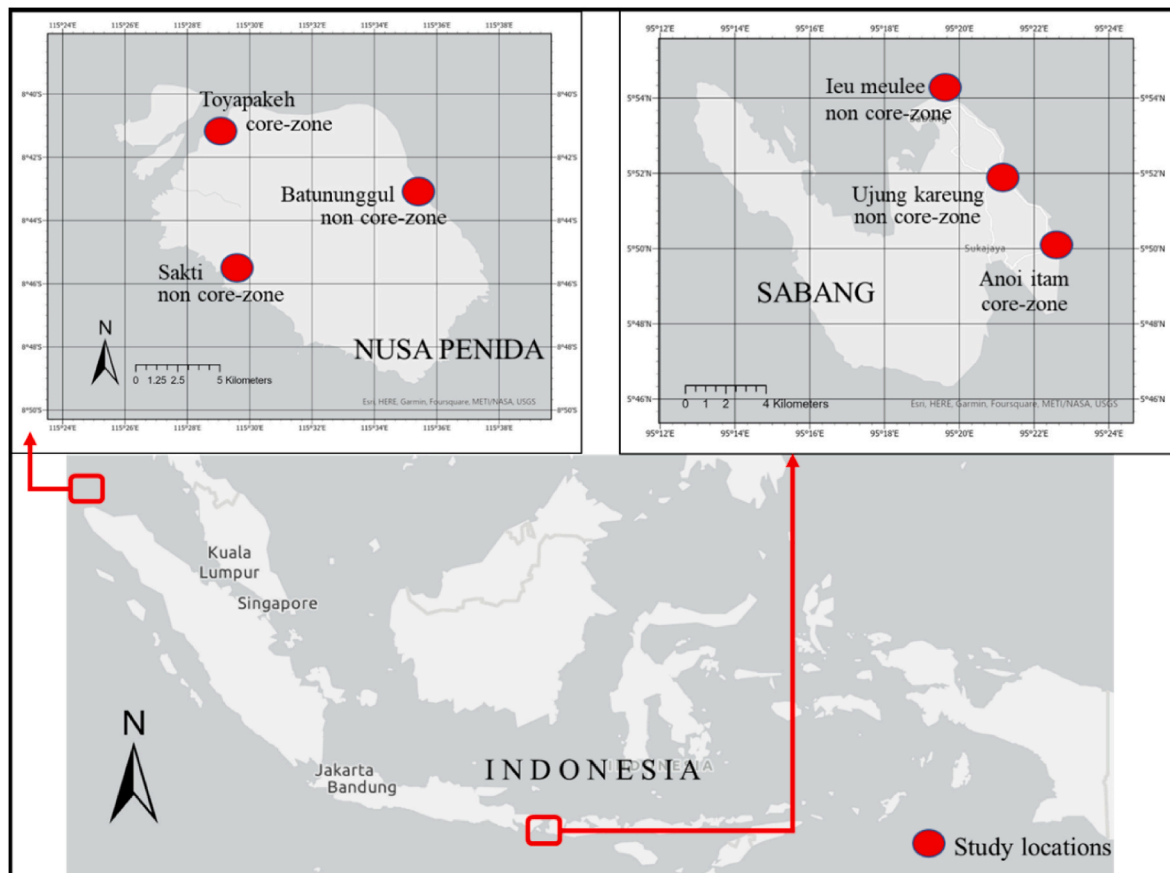


Fig. 1. Study location in two MPAs in Indonesia.

questions about the MPA's management and the NGO's role.

We used NVivo v. 20.1.6 (QSR International, 2022) to assist us with a thematic analysis (Boyatzis, 1998) of the qualitative data for understanding the role of customary law in helping conservation projects and how customary management and formal conservation management interact. Thematic analysis is used to identify, analyse, and draw patterns that capture information in relation to the research questions (Braun & Clarke, 2006). These patterns, delivered using themes and codes are causally related (Boyatzis, 1998). Here, a code is a word or phrase that identifies a process, issue, role or place (Castleberry & Nolen, 2018), related to history, conflict, and the benefit of rules. A theme is a pattern in the codes that captures important meaning related to the research questions (Braun & Clarke, 2006). We used an inductive coding approach, where the specific research question evolves through the coding process (Braun & Clarke, 2006). First, we prepared the text, translated them from their original language (Bahasa Indonesia) to English, and read through all of the text. Then we initiated codes that characterised (i) patterns within the text that have meaning for management, conservation, or law-related contexts; (ii) the use of local language terms (in Acehnese and Balinese) and how they are used to describe activities, policies, or laws related to conservation and customary management; and (iii) points of conflict emerging for issues identified by respondents (adapted from Nursey-Bray (2023) and Yanow (1999)).

Themes were built using the codes to address our research questions and to enable us to draw patterns and connections and explore interactions between the codes. We carefully selected the observed codes and grouped them into suitable themes. We observed four themes that included: (i) rules and prohibitions [RP], (ii) decision making [DC], (iii) management organization [MO], and (iv) actors and institutions [AI]. Within each theme, we assessed two categories, formal conservation

management (coded with CN) and customary law management (coded with CL). In order to understand the regulations and their implementation within both formal regulatory and customary management in protecting marine environments in Indonesia, we distinguished several components of formal regulatory conservation management [CN] such as rules and prohibitions [CN-RP], decision-making [CN-DC], management organisations [CN-MO], and customary law management [CL]. Further, we then conducted a non-parametric Spearman correlation in R v. 4.3.0 (R Core Team, 2022) to understand the relationship between a local community's knowledge of customary rules and laws in protecting marine ecosystem and its perspective on the effectiveness of customary rules and laws in supporting the goals of conservation project.

3. The history of customary law/adat law and customary management in governing marine and coastal resources in Indonesia

There is little knowledge on how and when *adat* law formed in Indonesia, but it is believed to be unwritten and uncodified laws and rules that have circulated among local communities since at least the Pasai Kingdom Era in the 1200's (Abdullah et al., 2018). The first mention of *adat* law was in 1893 by Christiaan Snouck Hurgronje in his book *De Atjehers*, meaning The Acehnese (Davidson and Henley, 2007). It is also assumed that only the Indigenous law of Malayo-Polynesians was present in Indonesia before Hindu civilization arrived in the fifth century, after which religion and foreign law influenced customary law until the present day (Holleman, 2013). Similar to the history of Northern Asian areas (i.e., Pakistan), customary law applied to the management of natural resources. In recent decades, these practice has been changing due to the increase in people's education and knowledge, the presence of non-governmental organisations (NGO), and the

influence of government regulations governing the same areas as *adat* (Bilal et al., 2003). *Adat* law in Indonesia has been evolving and changing with the influence of outside wisdom, science, and knowledge that have been brought to the country (Holleman, 2013). The divergent histories of the islands in this study (Bali and Aceh) have also influenced *adat* law for their local communities. Aceh has *Syariah* law, mostly influenced by Islamic law inherited from the Muslim kingdom era, while Bali has *awig-awig*, influenced by Hindu law inherited from the Hindu kingdom era. The way that they have formed *adat* law using *musyawarah* (the Indonesian National Dictionary defines *musyawarah* as ‘a joint discussion with the intention of reaching a decision on problem solving; or negotiations; or deliberation’) also influences present day *adat* law, with changing issues and problems circulating among local communities, rendering *adat* a dynamic and evolving living law.

“We do the *musyawarah* to discuss issues and problems. From this discussion we make customary law, we write down what are the prohibitions and what are the sanctions and who will be given the punishments”, Panglima Laot (2021).

In Aceh, the Panglima Laot (sea commander) authority was created during the Kingdom of Sultan Iskandar Muda as an official institution (van Engelenhoven, 2021). Panglima Laot refers to a man or locally elected person who manages fisher communities and fishing activities, including determining landing sites and boat mooring locations, deciding what fishing gear is allowed, and specifying fishing grounds for each fishing community. A group of Panglima Laot in an island each have a customary authority area with a defined size decided through *musyawarah* (i.e., one island such as Sabang can have more than ten Panglima Laot). In addition, there are rules that relate to what is now understood as conservation measures, such as prohibiting destructive coastal and marine activities (i.e., using explosives to catch fish), prohibiting destructive fishing gear such as trawl nets in certain areas, and determining sanctions for violators (Nurasa et al., 1994). The Panglima Laot also collect ‘tributes’ from outsider ships that enter Aceh waters, protect the sea, and resolve any conflicts in the area. The Panglima Laot institution not only applies to the sea; there is also a Panglima Laot (Lhok) who guards lakes, forests, and other areas surrounding the local community. We found that the duties of the Panglima Laot remain the same up to the present day; they are responsible for the safety and protection of their sea territory. However, their duty is somewhat ‘local’, resolving problems that emerge within the local community. Official reporting, monitoring, and patrolling are in the hand of local government (e.g., district, provincial) (Estradivari et al., 2022). Any local issues that involve the relationship between countries falls outside the scope of the Panglima Laot. Larger scale issues, particularly international issues, which involve other islands or other countries, are the responsibility of the national government of Indonesia.

“Inside the sea commander organisational structure, there is a chairman, vice chairman, secretary, treasurer and deputy. Each sea commander has a territory and members of fishers. The members do not have to be people in this village, there are also members from villages that are not in a coastal area”, Panglima Laot (2021).

Similar to the Panglima Laot in Aceh, there are customarily-recognized guards responsible for the management of the sea in Bali, locally called Pecalang. Pecalang comes from the word ‘*celang*’ which means sharp eyesight. Historically, Pecalang existed to maintain the security of an area, including the sea, in which case they are called Pecalang Segara (*segara* means water). Unique to Nusa Penida in Bali is the concept of Nyepi Segara, which is based on local wisdom and traditional practises that allow the sea to rest.

“Nyepi Segara in Bali is intended to give space to the sea for a short break (24 hours). No one can ride a boat, or even touch the water. Before Nyepi we do what in Balinese is called *Mulat Sarire*, it means we improve ourselves a month before. It is commonly called *Yasekerti*

here, which means we do not act arbitrarily, we do not say bad things, we do not behave in bad ways. Before and after we carry out the ceremony for Nyepi Segara”, Adat Leader, 2021.

Aceh also has the *Dewan Syariah* (Syariah Council), influenced by Islamic law, to regulate provincial laws, and has legalised Qanun (a decree) that is separate from state law. Similarly, in Bali, the authorities have distinguished between customary (*adat*) and official (*dinas*) law since the colonial era (Davidson and Henley, 2007). The Balinese local wisdom and beliefs have been influenced by Hindu practise, namely *Tri Hita Karana*. The *Tri Hita Karana* creed emphasises the balanced and harmonious relationship between humans, the environment, and the creator (Trialfhianty and Suadi, 2017). It is understood that these three elements are connected and need to be balanced and maintained to enable a good and stable life. The practice influences not only *adat* governance, but also official governance. The ‘Vision of the Bali Governor’, called *Nangun Sat Kerthi Loka Bali*, contains the following: “Maintaining the sanctity and harmony of Bali’s nature and its Contents to create a prosperous and happy life that is in accordance with Bung Karno’s [Indonesia’s first president Soekarno] Trisakti Principles for the nature and the people of Bali, namely Politically Sovereign, Economically Independent, and having Personality in Culture Patterned, Comprehensive, Targeted, and Integrated Development within the frame of the Unitary State of the Republic of Indonesia based on the values of Pancasila which was first articulated on June 1, 1945” (Bali government, 2023). The vision has 22 points or decrees, one of which is to develop and organize areas and environments so that they are green, beautiful, and clean. Therefore, although there is separation between official and *adat* laws, in reality it is hard to distinguish between them, as they carry the same ideas and concepts from Hindu practice. Since the national government released decentralization decree number 32 in 2004, both Aceh and Bali’s governments have the authority to produce decrees (called *Peraturan Daerah*), distinct from national law, enabling the inclusion of local influences into local official law.

In Indonesia, like in many countries across the Pacific (Pulea, 1993) and in Africa (Sunde, 2014), customary law is accepted and believed to be effective in managing natural resources and protecting biodiversity. As elsewhere (Lam, 1998), it is increasingly recognized that customary resource owners need to be involved in planning and decision-making for conservation from the very beginning if it is to be successful. Thus, there have been attempts over the years to codify *adat* law to incorporate it into national law and consensus. However, the idea that including customary resource owners in decision-making improves conservation was not the driving force behind this attempt, which began with the Dutch colonial administration and was supported by Snouck Hurgronje. In fact, when the Dutch tried to codify *adat* law, local communities—who were considered “customary resource owners”—were not even close to being acknowledged as having legitimate rights (Vickers, 2013). Thus, these efforts have been met with conflicts and rejections because of concerns over a loss of rights, flexibility (the flexibility of customary law will be discussed later) and the potential misinterpretation of local beliefs and customs (van Engelenhoven, 2021). In Indonesia, the term *adat* was introduced by Islamic merchants to refer to Indigenous customs or all matters that were beyond accepted (Islamic) law (van Engelenhoven, 2021). So, *adat* was not a system of law, but rather the system outside the law. Nevertheless, ways of acknowledging and incorporating customary laws, and its benefits, into state law are needed to both support conservation efforts, but also give local communities the freedom to perform their Indigenous and customary management.

4. Customary management versus formal conservation management in Indonesia waters

A pluralist legal system in Indonesia is inevitable, considering the diverse tribes, histories, cultures, and local languages present in the country. Legal pluralism is when a community or society is operated by

two or more forms of law (Craig and Gachenga, 2010). It has its advantages, where local wisdom and customary law are acknowledged by wider society and the state. The recognition of customary law, customary communities, and local wisdom is defined and recognized by the Indonesian government (Utomo, 2010). The national government has released several decrees to support *adat* law in the country (reviewed by Utomo (2010)).

- Law No. 45/2009 on Fisheries, Article No. 6: Fisheries management should take into account *adat* law (custom) and traditional knowledge, including community participation;
- Law No. 27/2007, on Management of Coastal Areas and Small Islands, Article 60: In management of coastal areas, the public has the right to manage its natural resources based on the existing customary law; and
- Government Regulation No. 60/2007 on Conservation of Fish Resources, Article 9: the determination of aquatic conservation areas is based on social and cultural criteria, including local wisdom and customs.

When it comes to the implementation of the law however, especially

for conservation projects such as marine protected areas, Indonesia is facing dualism. We found that the local communities are often confused about which activities are allowed or not allowed by customary versus national law. For example, in Nusa Penida (Toyapakeh village), in principle, the core zone is protected by national law from any activities, and any visitors require a permit. However, the core zone is in an area where the ferry from Nusa Penida to Nusa Lembongan traverses and many tourism activities, such as diving and snorkelling, are carried out. The ferry also became an important transportation link to connect people using both islands for activities such as trading and praying in the temple. Since the location of the core zone is not clearly defined and signposted, many of these activities are still running, and the local community (especially within Toyapakeh village) was opposed to the idea of locating a core zone in their waters. This issue is experienced by many conservation areas across Indonesia, where an inadequate integration or lack of combination of customary and national law causes tensions and conflict within local management (Nugroho et al., 2019).

Our analysis revealed the role of actors and institutions [AI] in both formal regulatory conservation and customary law implementation (Fig. 2). Overall, our findings confirmed that customary law management was mostly organized by *adat* law and included the *Pecalang* and

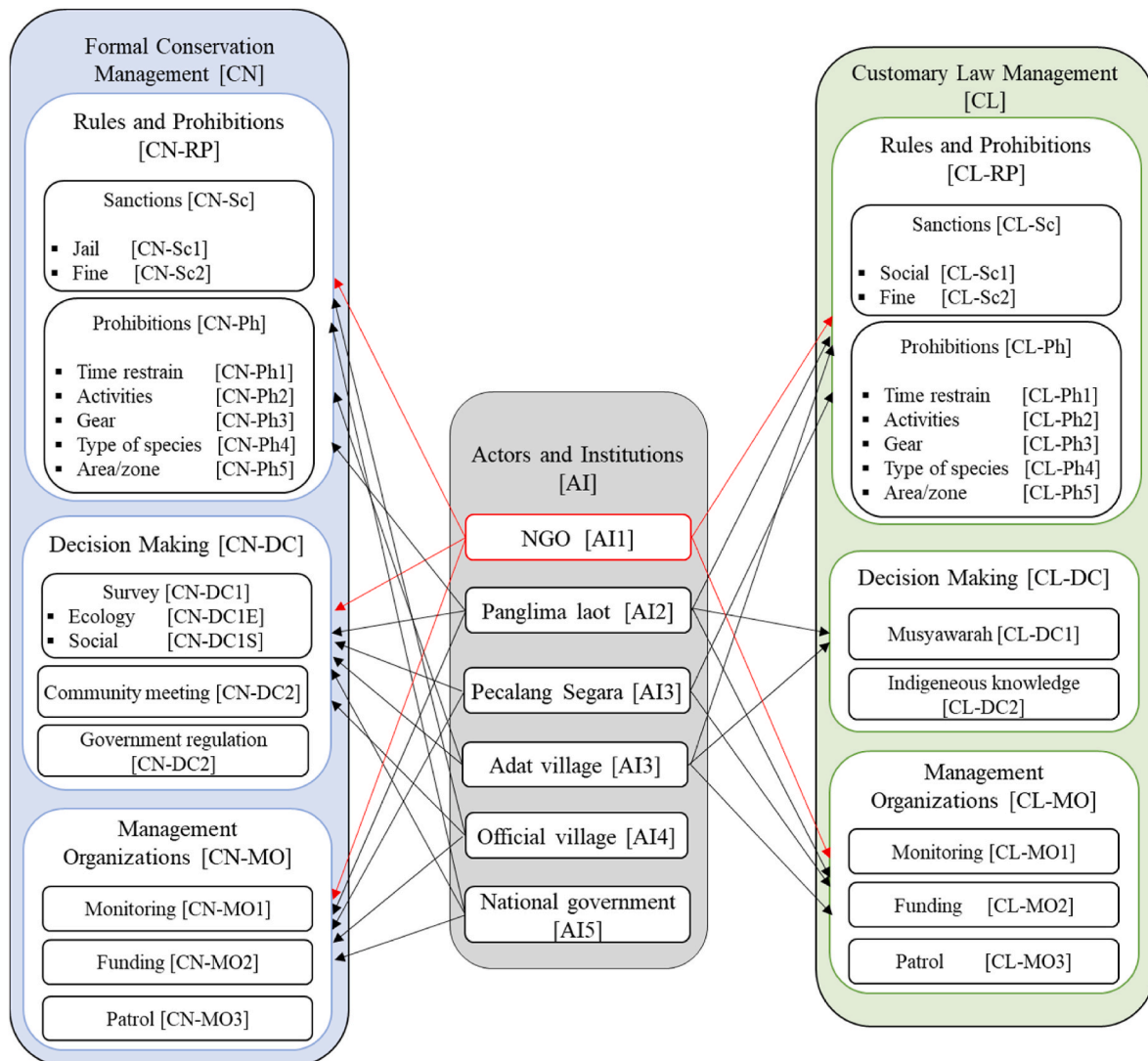


Fig. 2. Thematic analysis showing the components of Formal Conservation Management [CN] (left side) and Customary Law Management [CL] (right side), and how Actors and Institutions [AI] (middle) relate to each component. Black arrows show connections between themes or components, red arrows show how NGO connects to all components, except the decision making in customary law management, within conservation management and customary management. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

Panglima Laot. Formal regulatory conservation management involved a variety of actors such as government officials, as well as the *Panglima Laot* and *Pecalang*. NGOs were involved in all components of management in both customary and formal regulatory conservation management (Fig. 2).

The rules and prohibitions [RP] in customary law [CL-RP] and formal regulatory conservation [CN-RP] in Sabang and Nusa Penida are very similar (Fig. 2), likely because the rules have been influenced by one another. When conservation was introduced to Sabang and Nusa Penida, there was discussion about whether a certain rule was suitable or not for the local community that already had customary laws for managing their resources, including governing coastal and marine areas. For example, in Sabang, for tourism actors who had businesses along the customary zone (a zone that is specially managed by *Panglima Laot*), it was decided that they should not prohibit fishers from carrying out fishing activities in the customary zone area. In Nusa Penida, there is a core protection zone and a marine tourism zone. For marine tourism, the hours for activities were determined and set so that fishers and tourism would have different time periods to carry out their activities. Fishers can catch fish from 11 a.m. to midnight, whereas tourism activities, such as snorkelling and diving, can only be carried out from early morning to 11 a.m. (Supplementary material 1). We found that conservation rules implemented in different areas changed depending on how a compromise was reached between conservation and local community needs. However, we found that sanctions between formal regulatory conservation [CN-Sc] and customary law [CL-Sc] were dissimilar, where conservation managed by local government had two kinds of sanctions for those who violated the rules: jail and fines (Fig. 2). Customary management or *adat* law had sanctions embedded in social custom (e.g., not being allowed to enter the sea or village) and fines. This includes fishing gear detention for a week and a fine of Rp3,500,000 (Supplementary material 1).

The decision-making process [DC] includes how a MPA is initiated, established, and run by local government and local communities, including how they decide rules, and the roles of each party. In both locations, Nusa Penida MPA and Sabang MPA, the MPAs were initiated with the support of NGOs. The NGOs visited the areas, had meetings with the local community, surveyed marine conditions (ecological surveys and social surveys) and completed all essential documents and conditions to establish a MPA, following national government regulations.

“Indeed, the zoning process itself was a long process. We had meetings up to 66 times with the community. So, we were back and forth, revising the result of focus group discussion again and again, until they were all agreed. Originally, the core zone was 500 m wide. But it needed to be reduced to 20 m to make fishers agree with the zonation, because it is in fact their fishing ground. We looked into the regulations from national government that the zone needs to be at least 2% of the total marine area, so this zoning is acceptable”, NGO Nusa Penida (2021).

Adat also plays an important role in MPA establishment, because community meetings for formal regulatory conservation decision-making intrinsically include and consider the local communities’ engrained customary knowledge and culture.

“Custom regulates the placement of conservation areas, not all of them have to have a non-take zone because it is unfair for the community/fishers”, *Panglima Laot* (2021).

In Nusa Penida, there is also a sacred zone where many activities such as fishing, diving, and snorkelling are prohibited. This no-activity area is located in front of a large temple and established at the request of the community. In *adat* law, community meetings (called “*musyawarah*”) use local Indigenous knowledge to make decisions. This zone is an example of how *adat* law can establish rules differently to formal regulatory conservation, depending on local beliefs and customs.

The management organisations [MO] that govern MPAs differ. The way *adat* law manages the MPA [CL-MO] is slightly different compared to conservation managed by the local government [CN-MO]. MPAs managed through *adat* rules and leadership rely on the help of the whole community including members (fishers) and non-members (other local communities who live nearby). In Bali, *adat* governance supports conservation through the *Pecalang* who guards the sea. In Aceh, *adat* law supports conservation through the *Panglima Laot*. Members of the local community takes part in *Pecalang* activities as reporters. For example, they will report violations to the *Pecalang* or *Panglima Laot* who will immediately go to the location to admonish and hand out sanctions. Therefore, both *Pecalang* and *Panglima Laot* carry out enforcement of *adat* law in their own territory.

“It is a matter of custom. If there are tourists who might damage coral reefs, the sanctions will depend on the area in each customary village authority (*Desa Adat*), therefore the authority of the customary village is first, then if the problem cannot be resolved, it will be brought to the official village authority (*Desa Dinas*)”, *Adat Leader*, 2021.

“It is customary to have back up when something goes wrong. Unite the community, bureaucratic support. Traditional villages are self-help but have power. The official village authority is accountable to the central government, the customary village authority to the community”, *Adat Leader*, 2021.

When conservation projects are managed by a local community (called locally managed conservation areas), then conservation will entirely build on *adat* rules to support its management. However, even when the conservation project is managed by the local government or through an official village authority (e.g., *Desa Dinas*), *adat* institutions are still involved by providing assistance to official staff with patrols and monitoring, and convening community meetings. It is almost impossible not to involve *adat* leaders, as it is key to gaining local community trust. Unlike official government units or NGOs that receive funds from the Indonesian government or donors, *adat* implementation relies on community funding. This supports a well-managed *adat* organization, including a treasurer who manages monthly finances to support activities such as monitoring and patrols, without relying on donors or the government.

“We do not have anything to support us financially, we are self-funded having a monthly group contribution which is five thousand rupiah per person per month”, *Panglima Laot* (2021).

It is important to consider the roles of actors and institutions [AI] in the context of MPA management. *Adat* and official village leadership are two different things: the official village authority is recognized and regulated by the government, but *adat* leaders have a strong influence on local people. Therefore, in both Sabang and Nusa Penida, the government works alongside *adat* leaders to help officials undertake conservation work regulated by national government. For example, both local communities in Sabang and Nusa Penida created POKMASWAS, a law enforcement group, legally appointed by MMAF, but formed on the initiative of the communities who are aware of the importance of protecting marine and fishery resources. This group includes *adat* members (*Panglima Laot* and *Pecalang*) who have the duty to protect the sea and carry out conservation related activities. In both locations (Aceh and Nusa Penida), there is a patrol once a month. Local NGOs, *adat* members and MMAF staff assist with the patrol, some using their own budgets (collective budgets from NGOs and members of fishing groups), others using official government budgets. In addition, MPA monitoring is carried out once a year. The leader of an *adat* authority, who is respected, feared, and obeyed by the people, can be a bridge between national/official conservation goals and the local community. The leader plays a substantial role in supporting conservation by facilitating the transfer of conservation ideas, rules, and prohibitions that are understood and

obeyed by the local community.

“I told the community that this concept (core zone) is not far from the existing customary concept. In fact, I said yesterday that there are still sacred areas where we made them, now we just made them again but this time is inspired by the outsider; conservation idea and concept”, Panglima Laot (2021).

In terms of the connection between formal regulatory conservation and *adat* law, we found that NGOs have a greater role than other actors (drawn by red lines in Fig. 2). All the work related to conservation in Sabang and Nusa Penida was carried out by an NGO with the help of both the *adat* and the official village government. The NGOs made a significant contribution to the initiation of the MPAs, providing technical input, logistical, and financial support before their management roles were transferred to the local government and MMAF (Yunitawati and Clifton, 2021).

“We assist in activities in the field, for example training, capacity building, assisting tourism groups, and MPA monitoring, which we do every year. We also helped establish the MPA in Nusa Penida in the first place. We help propose MPA zoning, and accommodate the voice from communities. For example, if they do not wish a particular zone to be protected, we try to discuss it with them and find a better solution”, NGO Nusa Penida (2021).

The idea of integrating customary law and formal regulatory conservation management is widely discussed in the scientific literature (Aswani and Hamilton, 2004; Cinner and Aswani, 2007; Boli et al., 2014; Kittinger et al., 2014). Although integration might be possible, here we find that it can be difficult to do in practice when local and Indigenous wisdom for resource management is dominant. The national government of Indonesia has realised this, which is why they acknowledge customary law (if present). In particular, here our study finds that the integration of decision-making and sanctions faces difficulties. *Adat* laws governing the use and management of natural resources, including the marine ecosystem, will prioritise the interests of local people or people's wellbeing above all else. Moreover, where violations occur, punishments and sanctions will depend on the situation and local conditions; so, *adat* authorities will not put a person in jail, rather, they will use fines if someone has the money to pay, or social customs such as banning someone from entering their village. This flexibility to find the best solution for each case means that customary law is often unwritten and draws on local knowledge and social customs, which can be difficult to incorporate into more formal regulatory forms of management. However, when both customary and formal regulatory are successfully combined, it may rise compliance and, ultimately, management effectiveness (Ferse et al., 2010).

However, as has been mentioned previously, customary law can and does evolve under the influence of outside wisdom and knowledge (Holleman, 2013), including conservation knowledge. Communication and awareness raising, particularly when the leader of the *adat* or the traditional village authority is involved, can help with the integration process. Individuals embedded in and responsible for *adat* law can often become a ‘bridge’ (Trialfhianty and Suadi, 2017) between the local community and institutionalised conservation efforts. If an integration between customary law and formal regulatory forms of conservation management is to be reached, our analysis in Indonesia suggests that both systems need to be: (1) flexible, allowing for a balance between social, environmental, cultural, and local community wellbeing interests above political agendas. Furthermore, this flexibility relates not only to the balancing of interests, but also to the legal framework of the country allowing the recognition of community-based management and its structures in the first place; (2) widely communicated, with links established between customary councils, local and national government, and other stakeholders, including NGOs; and (3) clearly written, as codifying unwritten customary law would serve to make it visible. However, this will inevitably create tensions with the need for

flexibility. The use of *musyawarah*, or community meetings, to address matters and conflicts that fall outside of written laws will be important, with clear communication of their discussions to all stakeholders.

5. The effectiveness of customary law in supporting marine protected areas

The majority of the local communities in Nusa Penida and Sabang agree that *adat* law is effective in supporting MPAs, with more than 80% of respondents agreeing in all locations, except for Toyapakeh village, which is located in Nusa Penida (Fig. 3). Similarly, knowledge of customary law in local communities is high, except in Toyapakeh village (Fig. 3). The Spearman correlation test shows a very strong correlation between the variables ‘knowledge of the existence of customary law’ and the ‘effectiveness of customary law related to the MPA’ ($p\text{-value} < 0.001$). The more people know about customary law and its practise, the more they believe that customary law is effective in protecting and conserving the environment, especially their marine environment. This is similar to a study in the Pacific that also reported that written and unwritten customary conservation and management laws are important to effectively protect marine biodiversity and the environment (Pulea, 1993).

Toyapakeh is situated in north Nusa Penida, where the core zone of the Nusa Penida MPA is located. This village is demographically unique, because the majority of the villagers are Muslim, compared to the surrounding Hindu villages. The *awig-awig* customary law legalised by the *Desa Adat* is most influenced by Hindu practice. As such, it is possible that many people in Toyapakeh do not understand how customary law works in Nusa Penida, have little knowledge about the local customary law and do not agree with the local customary laws that are being used to support MPAs.

“Customary law is not functioning properly, it needs cooperation from all parties”, Open-ended questionnaires Toyapakeh village Nusa Penida, 2021.

Local communities are positive about the enforcement of rules and prohibitions both inside and outside the MPA. However, most of the local respondents believe that the implementation and rule enforcement of customary laws regarding protection of the marine environment are more effective and respected by local people than formal regulatory conservation.

“The implementation of customary law is more effective than the rules in conservation itself”, Open-ended questionnaires Sabang, 2021.

“Effective because customary law is stronger in society”, Open-ended questionnaires Nusa Penida, 2021.

This support comes not only from how customary law is created, but also because people feel that customary law better understands their situation and that decisions are made based on local values. When dealing with problems within the community, the Panglima Laot is believed to use a traditional approach, a sense of justice and propriety, incorporating religious values and conscience, especially if a management challenge falls outside of what is covered by national law (Nasir et al., 2022).

“Fishing communities are very obedient to customary law because customary law prioritises deliberation and consensus”, Open-ended questionnaires Sabang, 2021.

In our study case, besides tourism, migratory fishing practices is common in Indonesia where fisher sail to other fisher's waters to fish and created problems and conflict between local fishing communities. Thus, the effectiveness of customary law is threatened by tourism and other activity of outsiders. On islands such as Bali or Sabang, where people from outside are free to come and enjoy the many attractions,

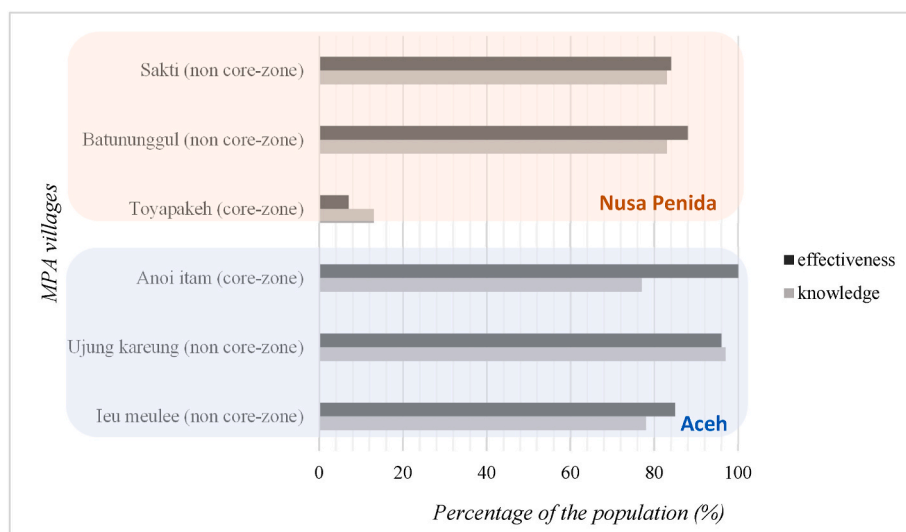


Fig. 3. Percentage of respondents who affirm to have knowledge of customary law and those who believe it is effective in supporting MPA management.

including diving and snorkelling, it is important that local knowledge and wisdom is communicated effectively to prevent violations of the law. In the surveyed communities, both in Bali and Sabang, most respondents agreed that outsiders who had limited knowledge of customary law often broke it.

“It [customary law] is effective because all Balinese people do not do activities that can damage the environment, except people from outside Bali”, Open-ended questionnaire Nusa Penida, 2021.

6. General implications

Our findings are similar to experiences of *adat* law elsewhere in Indonesia, such as *sasi* in East Indonesia, which also plays a significant role in helping communities manage their marine resources (Harkes and Novaczek, 2002). Villages performing *sasi* are found to be more effective in managing local marine resources and contribute positively to the development of marine management institutions (Harkes and Novaczek, 2002). However, as in our cases, this effectiveness of customary law in managing the marine environment and supporting conservation goals to protect biodiversity and promote sustainable use must be aligned with more formal regulatory forms of governance. While it is clearly written in the decrees (law no. 45/2009 article 6; law no. 27/2007 article 60; government regulation no. 60/2007 article 9) that the national government acknowledges customary law and supports local communities’ management of their own resources, in practice, legal pluralism in Indonesia is often challenging. The national government typically considers itself more knowledgeable about conservation issues than local people, and so gives more emphasis to official policy making to resolve the problems related to conservation issues (Nugroho et al., 2019). Integration of customary and formal regulatory laws is also made more difficult in Indonesia because of the many policies and legalisation drafted by sectoral ministries, which tend to maintain sectoral interests over local or national interests (Nurhidayah, 2010).

It is important to continue to find ways to reconcile not only between formal regulatory conservation and customary laws but also between actors and institutions involved within planning, management and implementation. Tensions and conflicts may have profound effects on the sustainability of any community-based marine management and conservation projects that acknowledge customary or traditional practice (Techera, 2010). Future MPA management processes need to incorporate and accommodate multiple actors and their perspectives (Nurse-Bray, 2023). This will need to include commitments to develop

good management systems using both customary and formal regulatory conservation knowledge, both customary and formal regulatory actors, and both conservation and livelihood objectives. Furthermore, our findings suggest that both customary and formal regulatory conservation must be clearly stated and widely communicated to avoid conflict, particularly when outsiders can come in and use marine resources without knowing about and understanding customary laws.

7. Conclusions

Customary law plays an important role in increasing the effectiveness of conservation actions such as marine protected areas. Our study finds that the majority of local people have good knowledge on the application of customary law in their village to manage and protect the marine environment, and believe that it is effective in supporting the objectives of MPAs. Customary law can therefore act as a bridge between formal regulatory forms of conservation and local communities by facilitating the transfusion of conservation knowledge and communicating goals and objectives. However, the integration of customary and formal regulatory conservation management poses challenges. There are differences in the ways that policy is decided and what sanctions are imposed; customary law prioritises deliberation and consensus focused on local people’s wellbeing above all else. Furthermore, there are often tensions and conflicts between the actors and institutions involved, because of differences in knowledge and their expectations for what roles they should play in conservation planning, management and implementation. Rule breaking does not only occur within local communities, especially in places where tourism and migratory fishing practice bring outsiders into a village. Outsiders are usually not cognisant of local rules and cannot be held accountable, so how to communicate the often unwritten customary rules to such outsiders poses a particular challenge. Ultimately, integration needs to recognise and incorporate rule flexibility to allow for differences in local contexts and local autonomy in decision-making. It needs clear channels for communication between all stakeholders from the local to national level and including NGOs, and flexibility needs to be balanced against the codification of local customary laws to make them more visible.

CRediT authorship contribution statement

Tyas Ismi Trialfhianty: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition,

Formal analysis, Data curation, Conceptualization. **Claire Helen Quinn:** Writing – review & editing, Supervision, Investigation, Data curation, Conceptualization. **Maria Beger:** Writing – review & editing, Supervision, Investigation, Data curation, Conceptualization.

Ethical approval

This research is a part of a research project approved by Faculty of Biological Science Ethics Committee, University of Leeds, under ethics number BIOSCI21-003 Socio-Ecological Analysis in Evaluating the Impact of Marine Protected Areas.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Tyas Ismi Trialfhianty reports financial support was provided by Indonesia Endowment Fund for Education.

Acknowledgements

The authors would like to acknowledge the Coral Reef Triangle Indonesia (CTI) Nusa Penida, local government of Nusa Penida (Pak Dwi and Pak Ketut), Wildlife Conservation Society (WCS) Sabang, Panglima Laot Ieu Meulee, Panglima Laot Ujung Kareung, Panglima Laot Anoi Itam and KKP Sabang for helping with data collection. This study was fully funded by a scholarship by Indonesia Endowment Funds for Education (LPDP) to TT.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ocecoaman.2025.107543>.

Data availability

Data will be made available on request.

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