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Contribution of local governments to a national commitment of the Aichi Biodiversity Target 11: the case of West Nusa Tenggara Province, Indonesia

Arisetiarso Soemodinoto, Irfan Yulianto, Tasrif Kartawijaya, Yudi Herdiana, Prayekti Ningtias, Kenneth R. Kassem and Noviar Andayani

Wildlife Conservation Society (WCS) Indonesia Program, Bogor, Indonesia

ABSTRACT

As a mega-biodiversity country, Indonesia ratified the United Nations Convention of Biological Diversity in 1994, and by so doing, Indonesia is obliged to meet Aichi Biodiversity Target 11. The target states: 'by 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape'. Indonesia has been committed to set aside 20 million hectares of its coastal and marine waters for biodiversity conservation by 2020, en route to achieving the national target of at least 30 million hectares in the future. Here we demonstrate how the development and expansion of marine protected areas (MPAs) at the local level is crucial if the national government is to achieve the target. Using West Nusa Tenggara (WNT) Province as a case study, we describe the current achievements as well as plans for expanding marine conservation areas in the province by 2020. Despite challenges along the way, by 2016 the province managed to set aside 229,555.36 ha for biodiversity conservation thanks to the district governments' efforts for establishing MPAs in their respective region. This figure covers approximately 7.87% of the province's marine waters and contributed 1.25% to the national target of marine conservation areas in 2017. Intelligent preparation of the province's coastal and small islands zoning plan will provide opportunities to allocate around 100,000 ha more to the WNT coastal and marine waters for conservation areas. With this addition, the total area is estimated to reach around 330,000 ha or approximately 10.29% of the province's marine waters and would contribute 1.50% to the national target of marine conservation areas by 2020. The related challenges and opportunities for reaching this important target in WNT Province are discussed.

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Introduction

Indonesia, an archipelagic country with two-thirds of its area being marine waters, has committed to set aside 20 million hectares of its coastal and marine areas for biodiversity conservation purposes by 2020¹. This is en route to a wider target of setting aside at least 30 million hectares to meet the Aichi Biodiversity Target 11, with the achievement date still to be determined. Having ratified the United Nations Convention of Biological Diversity in 1994², it is compulsory for Indonesia to reach this target of at least 30 million hectares and in order to do so, marine protected areas (MPAs) have been selected as vehicles for expanding the coverage of areas designated for the conservation of marine biodiversity (Kasasiah et al. 2013; Susanto, Suraji, and Tokeshi 2015).

Similar to other countries, the Indonesian government – both at the regional and national level – holds sole responsibility for developing and expanding the number and area of MPAs (cf. Kelleher 1999). Up to the end of 2003, and for more than five decades leading up to it, it was solely the national government's responsibility to establish and manage MPAs³. However, in 2004 a new law came into place allowing a more decentralised governance system where the management of MPAs could be carried out by both national and local governments. This provided opportunities for local government to take bigger responsibilities and execute authorities for managing their own MPAs, whilst also helping national governments to ease the funding burden for managing MPAs across the vast area of Indonesia.

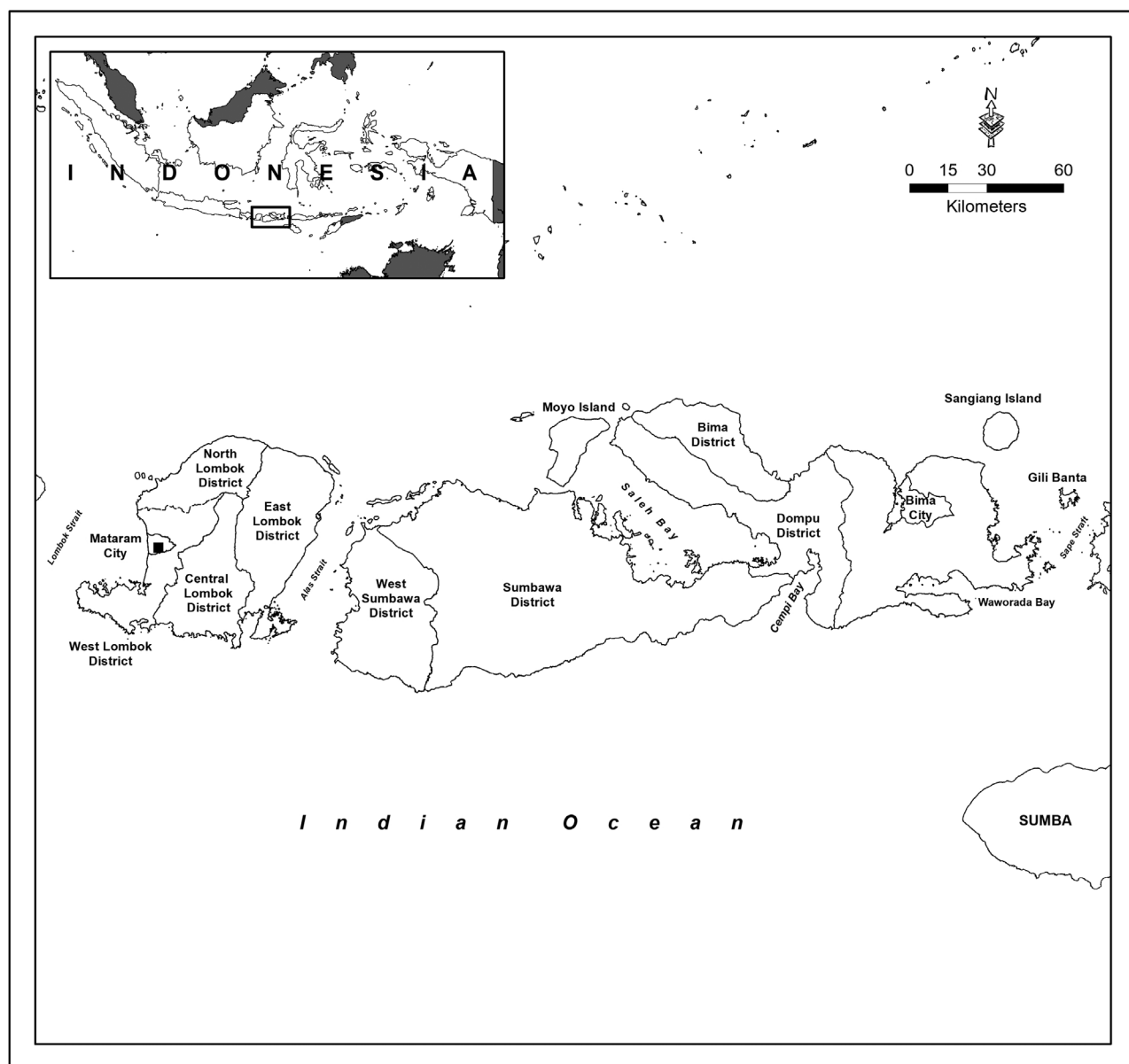


Figure 1. Map of West Nusa Tenggara Province, Indonesia.

In this paper, we demonstrate how the development and expansion of MPAs at both the district and provincial level would be a massive contribution for the national government to achieve Indonesia's target for conservation of marine biodiversity. West Nusa Tenggara (hereafter WNT) Province has been selected for this study because it is among the few provinces in Indonesia which exhibit obvious progress towards the development and expansion of MPAs. For this study, we employ the environmental-historiography method (Soemodinoto 2010) to trace back and we then show progress and challenges for establishing, managing and expanding MPAs in WNT, as well as their contribution toward the achievement of Indonesia's commitment of Aichi Biodiversity Target 11.

Marine biodiversity of WNT

WNT Province is a complex of islands and islets with two major islands (Lombok and Sumbawa) (Figure 1). With a total land area of 20,153.15 km² and marine waters of 29,159.04 km², the province covers a total area of 49,312.19 km² (WNT Province 2017). Situated in the heart of the Lesser Sunda Ecoregion, WNT is endowed with rich and biodiverse coastal ecosystems such as coral reefs, mangroves and seagrass beds (Huffard, Erdmann, and Gunawan 2012; Monk, De Fretes, and Reksodiharjo-Lilley 1997; WNT Province 2017). The coverage of coral reefs, mangroves and seagrass beds is 921, 121 and 53 km², respectively (Geospatial Information Agency 2016). Coastal and marine resources in WNT are influenced

by Indonesian Throughflow and Indian Ocean Dipole (Huffard, Erdmann, and Gunawan 2012; Kida and Wijffels 2012; Ningsih, Rakhmaputeri, and Harto 2013).

Coral reefs are well distributed throughout the coasts of WNT. A total of 36 coral genera have been found so far in WNT with Sumbawa having the highest number of genera compared to Lombok (36 to 30, respectively) (Pardede et al. 2014; Tarigan et al. 2015). The condition of coral reefs as indicated by coral covers was highly variable, between 2.8% and 88.0% (Pardede et al. 2014; Tarigan et al. 2015). Threats to coral reefs are mostly coming from blast fishing, cyanide fishing and over-fishing (Burke et al. 2011).

Mangrove ecosystems can only be found in small embayments of islands and islets throughout WNT (Monk, De Fretes, and Reksodiharjo-Lilley 1997; WNT Province 2017). A total of 19 species of mangrove have been reported, of which 10 are of threatened status (WNT Province 2017). With mangrove conditions reflecting the impact of human activities throughout the province, the main threat to mangroves in WNT is physical damage due to land use change for coastal development (Monk, De Fretes, and Reksodiharjo-Lilley 1997).

Seagrass beds can only be found in the selected coasts of WNT (Poedjirahajoe et al. 2013; Yulianto et al. 2016; Yusron 2009). They are generally found in small patches and close to human settlements (Poedjirahajoe et al. 2013). A total of 10 seagrass species have been found in WNT, with ranges between 1% and 78% (Poedjirahajoe et al. 2013; Yusron 2009) in coverage. As is similar to mangrove forest, one of the main threats to seagrass beds in WNT is physical damage due to land use change for coastal development (Monk, De Fretes, and Reksodiharjo-Lilley 1997).

One important resource that directly supports the livelihood of many coastal residents of WNT is fisheries resources, covering pelagic, demersal and reef fishes (WNT Province 2017). Pelagic fishes commonly caught are yellowfin tuna, mackerel tuna, skipjack, sardinella and anchovy, amongst others; whereas demersal and reef fishes include groupers, snappers and fusiliers. WNT's total fish production in 2016 was 227,000 tonnes, which is a twofold increase since 2009 (WNT Province 2017). Most fish production comes from fishing villages that are concentrated in Sumbawa Island (WNT Province 2017).

WNT Province has also benefited from marine biodiversity through tourism, with three main types of biodiversity-based marine tourism: landscape/scenic, beach and underwater. Major destinations are in Lombok (e.g. Gili Matra and Senggigi Beach), and Sumbawa (Moyo Island and Cempi Bay) (WNT Province 2017) with Lombok attracting more than one million international visitors per year (Coordinating Ministry for Economic Affairs 2011).

The biologically diverse coastal and marine ecosystems of WNT have been utilised by local residents to support their livelihoods of fishing and tourism. However, many of these important ecosystems are threatened by such human activities and should be viewed with a great deal of cautious and protective measures need to be put in place to avoid over-exploitation.

Development and expansion of MPAs in WNT Province

The WNT Province has a long history of MPAs, spanning more than three decades (Table 1). In the 1980s, it became the first province in Indonesia to be allocated an MPA by the national government, with a protected area for both terrestrial and marine recreation purposes, i.e. Pulau Moyo Marine Recreation Park & Game Reserve (Wahyuni and Mildranaya 2010). Following the enactment of Law 5/1990, two coastal and marine protected areas were created later, i.e. Gili Matra Marine Recreation Park in 1993 (Santiri 2014), and Pulau Satonda Nature Recreation Park in 1998 (Wahyuni and Mildranaya 2010). Gili Matra was later handed over to the Ministry of Marine Affairs and Fisheries⁴ in 2009 (Santiri 2014).

The development of MPAs by the district government started in 2004 following enactment of Law 32/2004 which divides authority of managing coastal and marine areas between district governments (for coastal waters between 0 and 4 nautical-miles perpendicular of coastline), and to provincial governments (for marine waters between 4 and 12 nautical-miles), thus providing stronger authority for district governments to manage its own coastal jurisdiction. Recognising the importance of biodiversity for local economic development via tourism, two marine recreation parks, Gili Lawang and Gili Sulat in 2004 and Gili Banta in 2005, were established by respective district governments.

Further development and expansion of district-level MPAs gained momentum when a law⁵ and a government regulation⁶ paved the way for the establishment of aquatic, coastal and small island conservation areas (*Kawasan Konservasi Perairan, Pesisir dan Pulau-pulau Kecil* or KKP3K) throughout Indonesia under the Ministry of Marine Affairs and Fisheries and associated offices at district level were enacted in 2007. Following an official statement that Indonesia will set aside 20 million hectares coastal and marine waters by 2020 for conservation purposes (see footnote 1), district-level MPAs were established throughout WNT between 2011 and 2015, and expanded the total area of MPAs from 50,500 ha in 2005 to 229,555.36 ha in 2016.

The enactment of Law 23/2014 which revokes the district governments' authority of managing coastal waters



Table 1. Development and expansion of MPAs in WNT Province in chronological order up to 2016, along with enactment of relevant laws and regulations by the Government of Indonesia via Ministry of Forestry and Ministry of Marine Affairs and Fisheries in the last three decades.

Year	Type and name of MPA	Legal status	Legal status revision	Location	Total area (ha)	Total area by year (ha)
1986	Pulau Moyo Marine Recreation Park and Game Reserve	Minister of Forestry decree number 380/Kpts-II/1986 (with total area 6000 ha for marine park, and 22,250 ha for game reserve)		Sumbawa district	6000.00	Not relevant*
1990	Enactment of Law 5/1990 on Conservation of Biological Resources and Their Ecosystems					
1993	Gili Matra Marine Recreation Park	Reserved as National Marine Conservation Area by Ministry of Forestry decree number 85/Kpts-II/1993	Gazetted as Gili Matra Marine Nature Recreation Park by the Minister of Forestry decree number 99/Kpts-II/2001 (later was handed over to Ministry Marine Affairs and Fisheries**)	North Lombok district	2954.00	Not relevant*
1998	Pulau Satonda Nature Recreation Park	Minister of Forestry decree number 22/Kpts-VI/1998 (with 453.7 ha terrestrial area, and 2146.3 ha coastal area)		Bima district	2146.30	Not relevant*
2004	Enactment of Law 32/2004 on Regional Governance					
2004	Gili Sulat & Gili Lawang Marine Recreation Park	Head of East Lombok District decree number 188.45/452/KP/2004	Head of East Lombok District decree number 188.45/332/KP/2014	East Lombok district	10,000.00	10,000.00
2005	Gili Banta Marine Recreation Park	Head of Bima District decree number 686/2005		Bima district	40,500.00	50,500.00
2007	Enactment of Law 27/2007 on Management of Coastal Zone and Small Islands (later amended to Law 1/2015)					
2011	Gita Nada Marine Recreation Park	Head of West Lombok District regulation number 56/2011	Head of West Lombok District regulation number 23/2014	West Lombok district	21,556.00	72,056.00
2011	Gili Balu Small Island Park	Head of West Sumbawa District decree number 849/2011	Head of West Sumbawa District decree number 1019/2014 on amendment of decree number 849/2011	West Sumbawa district	6005.20	78,061.20
2011	Tatar Sepang Coastal Park	Head of West Sumbawa District decree number 849/2011	Head of West Sumbawa District decree number 1019/2014 on amendment of decree number 849/2011	West Sumbawa district	723.16	78,789.36
2011	Kabete Small Island Park	Head of Sumbawa District decree number 642/2011	Head of Sumbawa District decree number 1198/2014	Sumbawa district	2000.00	80,789.36
2013	Teluk Bumbang Marine Recreation Park	Head of Central Lombok District regulation number 40/2013 (with total area 22,940 ha)	Re-establishment of Teluk Bumbang Marine Recreation Park through Governor of WNT decree in 2016	Central Lombok district	6310.00	87,099.36
2013	Teluk Cempi Marine Reserve	Head of Dompu District decree number 23/2013 on reservation of Teluk Cempi Special Fisheries Zone with total area 25,804 ha	Change of MPA type, from Special Fisheries Zone to Marine Reserve	Dompu district	39,000.00	126,099.36
2014	Penyu Lunyuk Coastal Park	Head of Sumbawa District decree number 1212/ 2014		Sumbawa district	70,000.00	196,099.36
2014	Enactment of Law 23/2014 on Regional Governance (revising Law 32/2004 on Regional Governance)					
2015	Pulau Liang & Ngali Marine Recreation Park	Head of Sumbawa District decree number 1441/2015		Sumbawa district	33,461.00	229,555.36
2016	Coastal, Marine and Small Islands Conservation Areas of WNT Province	Governor of West Nusa Tenggara decree number 523-505/2016		WNT Province	229,555.36	
2016	Harmonisation process for management of coastal, marine and small islands conservation areas in WNT Province					
2017	Preparation and finalisation of Coastal Zone & Small Islands Management Plan for WNT Province					

Note: *This paper discusses contribution of local (provincial) government's efforts to national commitment of Aichi Biodiversity Target 11, so the contribution of Ministry of Forestry which is nota bene a national ministry is not counted. The figures are used to give a historical background regarding development of marine protected areas in WNT Province.; **Gili Matra Marine Recreation Park was handed over to the Ministry of Marine Affairs and Fisheries in 2009, and re-designated through Minister of Marine Affairs & Fisheries decree number KEP67/MEN/2009 with new title Marine Recreation Park of Gili Ayer, Gili Meno and Gili Trawangan Islands.

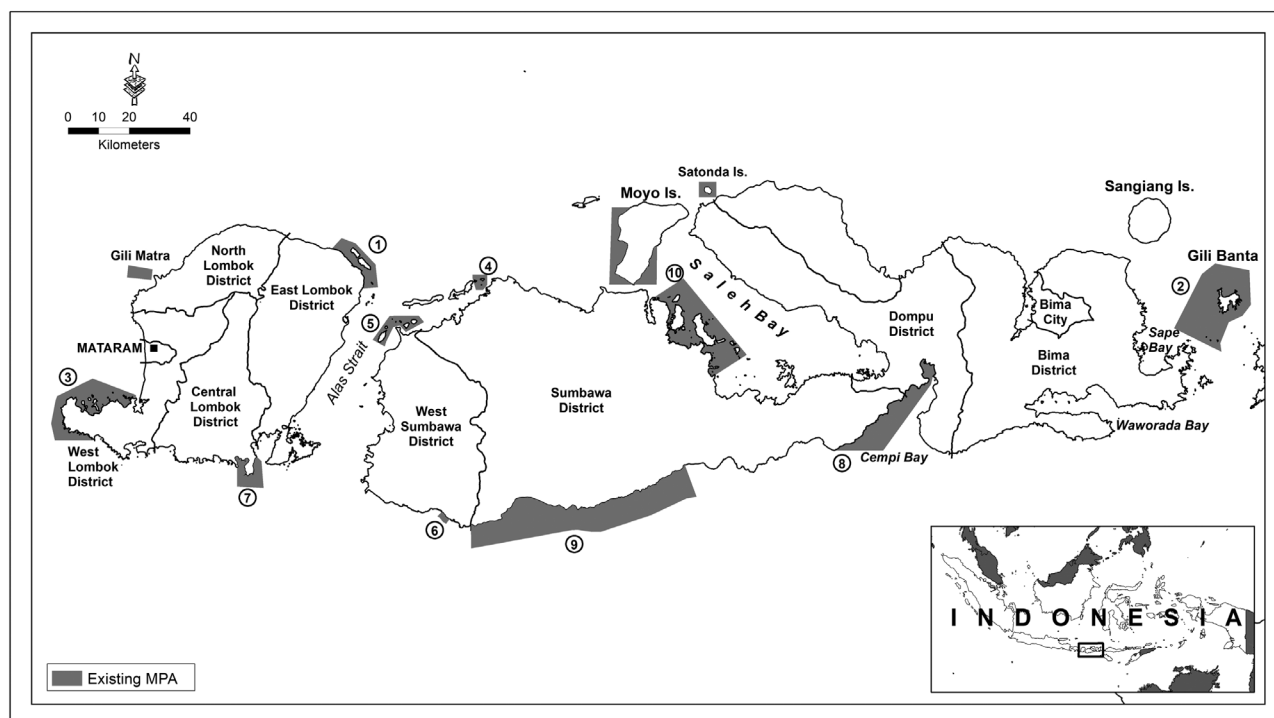


Figure 2. Distribution of three MPAs initiated by Ministry of Forestry (Moyo Island, Satonda Island and Gili Matra), and ten MPAs by district government (1-Gili Lawang & Gili Sulat; 2-Gili Banta; 3-Gita Nada; 4-Gili Balu; 5-Tatar Sepang; 6-Kabete; 7-Teluk Bumbang; 8-Teluk Cempi; 9-Penyu Lunyuk; 10-Pulau Liang & Ngali).

and transferred it to provincial government has changed the situation significantly and required provincial governments to take over the administration and management of all MPAs that had previously been established by district governments⁷. As a result, a governor regulation was published in 2016 to reserve all MPAs established by district government to provincial-level MPAs with the same total area of 229,555.36 ha. This figure roughly represents 7.87% of the province's marine waters. One important point relating the establishment of provincial MPAs is that they would be managed as a network that integrate fisheries, biodiversity and climate change objectives, as recommended by Fernandes et al. (2012). The distribution of existing provincial MPAs along with three MPAs under the administration of the Ministry of Forestry and Ministry of Marine Affairs and Fisheries is presented in Figure 2.

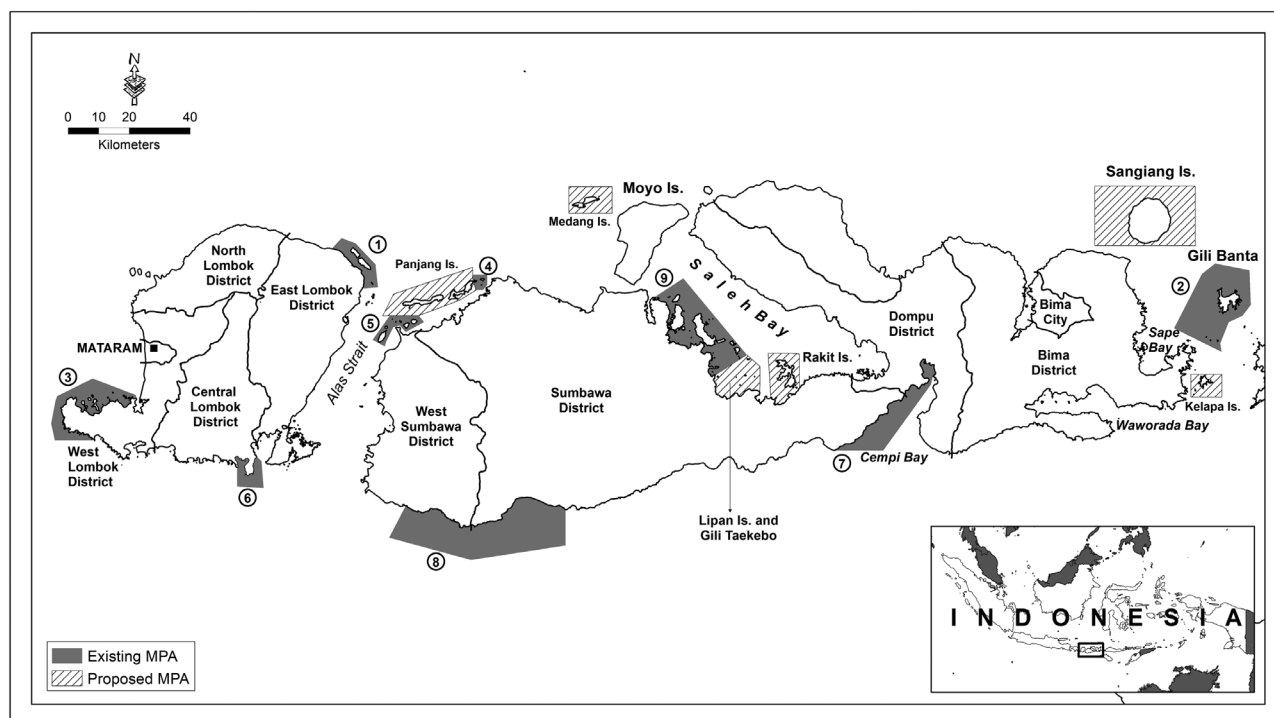
The Law on Management of Coastal Zone and Small Islands (see footnote 5) (*Undang-Undang Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil*) requires all marine-bordered districts and provinces in Indonesia to prepare 'coastal and small islands zoning plans'. These plans are aimed at reducing potential conflicts among different users by spatially allocating incompatible activities into relevant zones and at the same time encouraging balanced sea-use. Responding to this, the provincial government prepared the zoning plan for WNT from January

to November 2016. One important output of the zoning process was that the WNT Province decided to allocate approximately 330,000 ha (or around 10.29%) of its coastal and marine waters for conservation areas that will need to be achieved in 2020 (Table 2). Combined with three MPAs established by national government (see first three MPAs in Table 1), WNT Province will have a total of 341,641.55 ha (or around 11.72% of provincial marine waters) for conservation areas by 2020.

During the zoning process, however, consultations with the stakeholders raised a number of inconsistencies between existing conservation areas allocated via the WNT Governor's regulation in 2016 and those proposed through the zoning plan. Some adjustments were then carried out by reducing or expanding the area of selected existing MPAs to accommodate zones for seaports and mining. The area of two MPAs, i.e. Gita Nada Marine Recreation Park and Teluk Cempi Marine Reserve, were reduced to 21,332.52 ha (from 21,556 ha) and 22,387.31 ha (from 39,000 ha), respectively. Two MPAs (Tatar Sepang Coastal Park and Penyu Lunyuk Coastal Park) were merged and their combined total area was increased from 70,000 ha to 72,415.29 ha. As a result, the total area allocated for conservation was adjusted to 214,411.32 ha (from initially 229,555.36 ha), giving a gap of 115,676.13 ha to be filled by the provincial government by 2020 (Table 2). Once the zoning plan is finalised and officially

Table 2. Planned expansion of MPAs in WNT Province in 2017–2020 according to the Province Coastal and Small Islands Zoning Plan.

	Year				
	2016	2017	2018	2019	2020
Total area of MPAs according to WNT Governor decree number 523–505/2016	229,555.36				
Total area of MPAs according to Coastal and Small Islands Zoning Plan	214,411.32				
Pulau Kelapa MPA (Bima district)		6,947.28			
Pulau Rakit MPA (Sumbawa district)			12,146.05		
Pulau Lipan and Gili Taekebo MPA (Sumbawa district)			14,494.76		
Pulau Panjang MPA (Sumbawa district)				22,138.47	
Pulau Medang (Sumbawa district)				11,339.56	
Pulau Sangiang (Sumbawa district)					48,610.01
Total area of MPAs (ha)	214,411.32	221,358.60	247,999.41	281,477.44	330,087.45

**Figure 3.** Distribution of existing and proposed MPAs according to WNT Province coastal and small islands zoning plan (WNT Province 2017).

endorsed (date still to be decided), six new MPAs will be established in WNT (Figure 3). As indicated in Table 2, the total area of new MPAs will be gradually increased to reach a cumulative of 115,676.13 ha that then would add to the planned 330,087.45 ha in 2020.

More than a decade after the district government's decision to develop and expand MPAs in WNT, almost 230,000 ha of coastal and marine waters in the area have been set aside for various MPAs for different purposes. A change of law in 2014 has since meant that management of MPAs was transferred to provincial governments, which resulted in a further allocation of more than 100,000 ha for conservation of coastal and marine biodiversity. This addition will arguably contribute to realising the Aichi Biodiversity Target 11, since the total area would cover more than 10% of WNT marine waters.

Discussion: progress versus challenges

In the previous section, we exemplified how local governments, i.e. the district and later the provincial governments, managed to establish MPAs and expand their coverage. By the end of November 2017, the total area of marine waters reserved nationally for biodiversity conservation had reached 18.43 million ha⁸. This means, currently WNT Province alone has contributed 1.25% to the current national target. When the provincial target of 330,087.45 ha (10.29% of WNT marine waters) is reached in 2020, the contribution to the national target will increase to 1.50%. Combined with MPAs established by national government, the WNT Province will have a total of 341,641.55 ha (or around 11.72% of provincial marine waters) for conservation areas by 2020.

In our opinion, such progress can happen because of two factors. First, the existence of supportive policies and environment are essential. Although policy setting in Indonesia is admittedly highly dynamic, it at least has provided an avenue for local governments to exercise their power and governance capability in managing coastal and marine biodiversity. Supportive policies are also needed to ensure that protected areas development has a legal basis (Lausche 2011). With clear legal status, incompatibility with other conflicting activities can be negotiated and this would provide corridors that lead to balanced development (Lausche 2011). Secondly, local governments need to recognise the importance of biodiversity for regional economic development. As argued by Fuentes (2011), biodiversity should be preserved and enhanced to support economic growth in terms of size and value. Establishment of MPAs in WNT which is mostly for tourism and recreation (and few for maintaining fish populations), in our opinion, strongly suggests good understanding of combining biodiversity protection with sustainable use of biodiversity as renewable resource.

Aichi Biodiversity Target 11 states that conservation of coastal and marine biodiversity should be carried out via effectively and equitably managed MPAs. The question then: is the expansion of MPAs in WNT due to effective and equitable management? In their study to map strategic steps for the smooth hand-over of MPAs management authorities from district to provincial governments, Aminollah et al. (2016) found that few MPAs in WNT have management units with sufficient funding in order to execute MPA management plan. This is one of the key limiting factors to the development of MPAs and the majority need serious attention if they do not want to be categorised as 'paper parks'. The classic problems of limited human resources, weak technical capacities and insufficient funding were identified as factors that hinder MPAs from going forward (Aminollah et al. 2016) and thriving.

One aspect that was not anticipated is the provincial government's readiness to take over the authority of managing MPAs. After many years being excluded from the process of establishing and managing MPAs, all of sudden the provincial government was given the hefty task to execute roles and responsibilities which it had never been given before. Prior to 2014 the roles and responsibilities of provincial governments were more centered on coordinating and facilitating districts, and it had limited authority in coastal areas between 0 and 4 nautical-miles where most of the MPAs exist. To cope with this challenge, a regulation⁹ was released in 2016 to establish provincial agencies for overseeing the management and surveillance of MPAs in three different areas (one in Lombok, and two in Sumbawa). The agencies, however, are not yet fully

operational due to the fact they are facing the same said problems as above of limited human resources, weak technical capacities, and insufficient funding. A number of recommendations surrounding regulation, institutional and human resource, facilities and financial issues should be addressed have been issued (Aminollah et al. 2016) but the positive changes leading to the effective and equitable management of MPAs in WNT remain to be seen. These findings strongly suggest that although many MPAs in WNT have been officially established, they are not necessarily managed effectively and equitably.

The issues of weak human resources and inadequate funding have been plaguing MPAs in both rich and poor countries, causing ineffective management and 'paper parks' (MPA News 2001). The persistence of these issues which hampered MPAs from performing to produce societal positive impacts was again reported in a recent study (Gill et al. 2017). The study found that conservation impacts of MPAs were strongly affected by staff and budget capacity, where MPAs with adequate staff capacity had ecological effects almost three times greater than MPAs with inadequate capacity (Gill et al. 2017). Furthermore, the study also emphasised the importance of adequate investment in human resources and funding capacity to support the global expansion of MPAs because without them, the conservation outcomes would be sub-optimal (Gill et al. 2017).

In our opinion, these challenges of human and funding capacities must be addressed if MPAs in WNT are to be managed effectively and equitably. One option that we strongly support is a proactive involvement from local communities by MPAs management units (Ervin et al. 2010). By involving local communities in managing MPAs, we believe the issue of human resources and funding can be solved, since they already live there/close by and can be involved in planning, surveillance, awareness raising, and monitoring activities. Studies have proven that protected areas involving local communities in their management generated better conservation outcomes (e.g. Bajracharya, Furley, and Newton 2005; McClanahan et al. 2006; Muhumuza and Balkwill 2013).

The WNT Province (and Indonesia in general) is not alone in facing the challenges and efforts to expand MPA coverage. Nevertheless, it should be stressed here that the expansion of MPAs alone is not enough. There must be combined efforts to ensure that the ecological and socio-economic benefits of MPAs reach the beneficiaries and stakeholders, who in turn can contribute to the conservation of coastal and marine biodiversity. Opportunities do exist for concerned parties to help the WNT Province government to realise effectively and equitably managed MPAs. Apart from technical and funding assistance that are traditionally provided by national government (i.e.

MMAF), respective parties could give a range of assistance to address human resource and funding capacity issues through provision of education and training for MPAs staff, as well as investment for supporting management activities (e.g. facilities for marine tourism), to name a few.

Notes

1. Opening and Keynote Speeches of the President of the Republic of Indonesia, H.E. Dr. Susilo Bambang Yudhoyono, at Coral Triangle Initiative Summit, Manado, Indonesia, 15 May 2009.
2. Law 5/1994 on Ratification of United Nations Convention of Biological Diversity.
3. Up until 1980s, MPAs in Indonesia were established and managed by the Ministry of Agriculture, before then being taken over by the Ministry of Forestry.
4. Ministry of Marine Affairs and Fisheries was officially established in 2000, and prior to its establishment all MPAs in Indonesia were administered and managed by the Ministry of Forestry.
5. Law 27/2007 on Management of Coastal Zone and Small Islands.
6. Government Regulation 60/2007 on Conservation of Fish Resource.
7. The law, while it was enacted in October 2014, came with two years transition period (to give time for transfer of authority and governance functions) before fully imposed in October 2016.
8. Ministry of Marine Affairs and Fisheries' Directorate of Marine Conservation and Biodiversity website kkji.kp3k.kkp.go.id, last seen 30 November 2017.
9. Governor of West Nusa Tenggara Regulation 53/2016 on formation, position, organisational structure, tasks & functions, and procedure of technical implementation unit in WNT Province.

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Disclosure statement

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