

Governance Analysis of Nha Trang Bay and Cu Lao Cham Marine Protected Areas, Vietnam

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Abstract

Nha Trang Bay and Cu Lao Cham Marine Protected Areas (MPAs) were established as the first two MPAs in Vietnam to protect the most diverse coral reefs against the impacts of unsustainable resource use. Emerging in a context of increasing decentralisation, the two MPAs have strongly relied on economic incentives, notably funding from donors and NGOs, to encourage behaviour changes towards achieving conservation objectives. Since donor funding ended, economic incentives used in governing the two MPAs have shifted the focus to income generated from MPA user fees. Consequently, the increasing influence of market forces, through mass tourism and incoming fishing pressures, has led to vested interests between provincial/city governments with tourism operators/developers and between local and non-local fishers. This paper stresses that without interventions from the central government or even international actors, the current MPA governance framework and incentives are insufficient to address the growing conflicts between biodiversity conservation and economic development. To improve MPA governance, strengthening legal incentives and stimulating political will from the central government are of the utmost importance. Also, given that social inequity issues are undermining local acceptance and support for MPAs, it is essential to empower local communities in decision-making over their resources by using property rights and promoting small-scale community-based development, while ensuring that such rights and development adhere to MPA conservation objectives. Moreover, tourism operators/developers need to be involved in governing MPAs in such a way that could contribute towards sustainable resource use and social equity for local communities.

Keywords: Marine Protected Areas, Biosphere Reserves, governance, biodiversity conservation, sustainable development, Vietnam, Cu Lao Cham, Nha Trang Bay, decentralisation, eco-tourism.

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1. Introduction

This study aims to analyse and compare the governance structures of two Marine Protected Areas (MPAs) in Vietnam – Nha Trang Bay (NTB-MPA) and Cu Lao Cham (CLC-MPA) (Fig. 1, Table 1) – using the MPA governance (MPAG) analysis framework [1]. It is part of the first author’s PhD research on governing marine resources and biodiversity conservation in Vietnam [2], and NTB-MPA and CLC-MPA are two of 28 MPAG case studies presented in this special section [3] [EDIT LATER IN REF LIST]. The selection of these two case studies was primarily based on Vietnam’s first marine biodiversity surveys of 1993–1995 in which NTB and CLC were listed as two amongst Vietnam’s six most important coral reef sites [4]. The two sites were included in Vietnam’s strategic plan for establishing the national MPA network, which comprises sixteen MPAs straddling along Vietnam’s coastline [5]. Various sources of data (mainly qualitative) for this study were collected during two field trips in CLC-MPA and Hoi An city (August–September 2015) and NTB-MPA and Nha Trang city (November–December 2015). These data, including extensive reviews of published and grey literature, in-depth interviews with key MPA actors (MPA staff, local fishers, tourism operators, local government officials, etc.) and ethnographic field notes produced from participant/non-participant observation, were triangulated to reduce biases and ensure the veracity of the research findings.

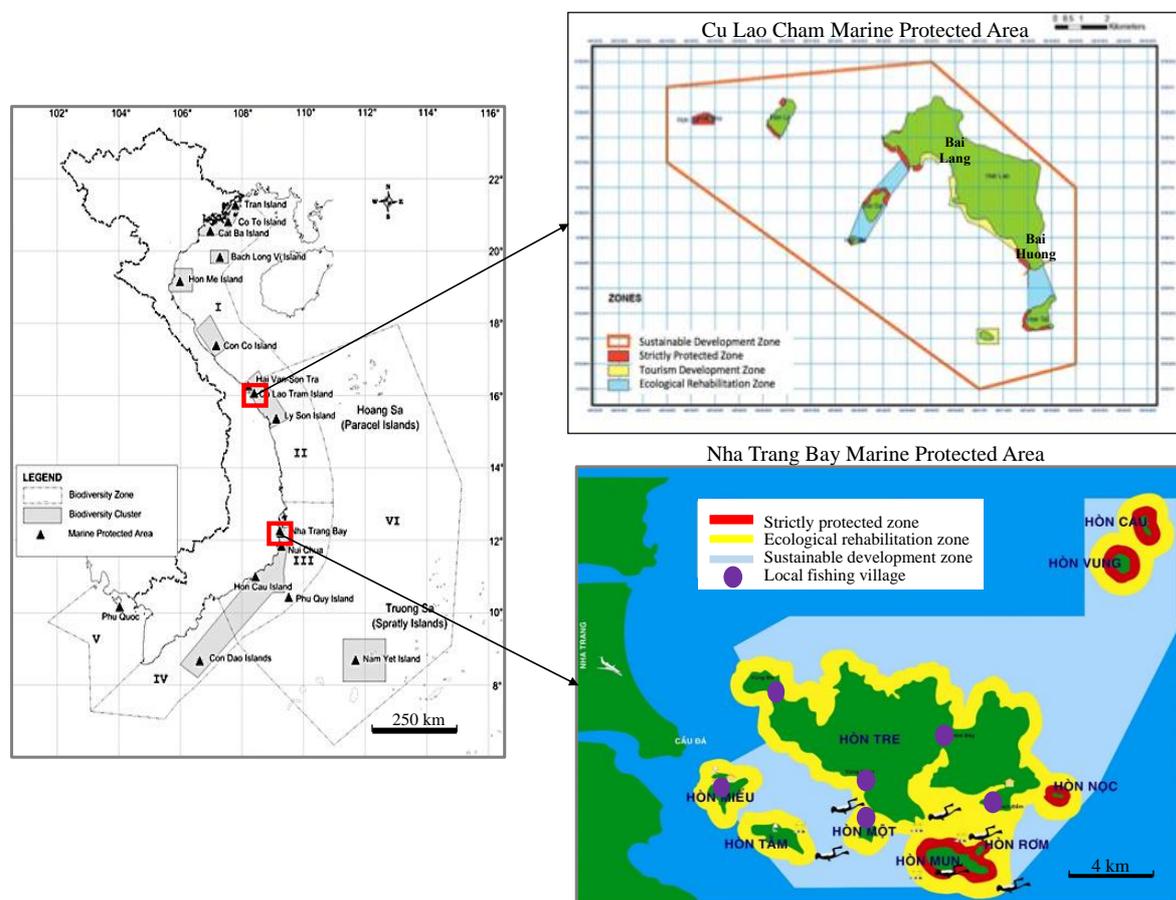


Fig. 1. Location and zoning maps of the studied MPAs.

Table 1 The two studied MPAs.

	Nha Trang Bay Marine Protected Area (NTB-MPA)	Cu Lao Cham Marine Protected Area (CLC-MPA)
Location	Nha Trang city, Khanh Hoa province (South-Central Vietnam)	Hoi An city, Quang Nam province (Central Vietnam)
Area	160 km ²	235 km ²
Year of designation	2001	2005

2. Contexts of the studied MPAs

2.1. Nha Trang Bay Marine Protected Area (NTB-MPA)

NTB-MPA is located in a vibrant and densely populated city, Nha Trang, of Khanh Hoa province in South-Central Vietnam (Table 2). In 1993, Vietnam's first marine biodiversity surveys classified NTB as the most diverse coral reefs in Vietnam, with 350 species of reef-building corals, 220 species of demersal fish, 160 species of molluscs, and 62 species of algae and seagrasses [4]. To protect the reefs from unsustainable uses, NTB-MPA was designated in 2001 as Vietnam's first MPA, which covers a total area of 160km² enclosing nine islands, with significant financial and technical inputs from the World Bank, Danish government and IUCN [6]. In 2005, as donor funding ended, NTB-MPA was administered by Khanh Hoa province, for which socio-economic development has critically relied on marine resources. Recently, the province has set a target of 55–60% of GDP contribution by the marine sector by 2020 [7]. In 2015, marine tourism and fisheries respectively contributed 12% and 9% to the province's GDP [8,9], NTB-MPA being instrumental to the development of both sectors due to its unique natural beauty and essential fishing grounds it provides for over 15,000 Khanh Hoa fishers [10].

In 2005, NTB-MPA, its surrounding islands, and Nha Trang's 25km-long coastline were designated as NTB National Heritage Area. Between 2006 and 2011, the Danish government continued funding NTB-MPA to promote sustainable livelihoods for local communities. In 2012, NTB-MPA was further decentralised to Nha Trang city, where tourism is especially intense, with a contribution of 64% to the city's GDP, though the city is still accountable to the provincial and national governments regarding the management of NTB-MPA and Heritage Area. At the MPA designation stage, over 80% of 5,000 MPA residents (Fig. 1) depended on fish as a primary source of income generation and subsistence. Most of them had a medium level of poverty index per national living standards [11] and electricity and freshwater supplies remain limited. Except fish, other commodities (poultry, meat, vegetables, etc.) are imported from the mainland. Each island village only has one primary school and medical station as essential facilities and infrastructure. Therefore, NTB villagers are mostly primary school leavers.

Table 2 Socio-economic development scenarios surrounding NTB-MPA.

Metric	Vietnam	Khanh Hoa province	Nha Trang city
Population per km²	308 ^[12] (2017 est.)	232 ^[16] (2015 est.)	1,596 ^[9]
GDP per capita	US\$ 2,343 ^[12] (rank 132/184, 2017 est.)	US\$ 2,650 ^[17] (2015 est.)	US\$ 3,350 ^[18] (2014 est.)
GDP growth rate	6.8% (2017 est.) ^[12]	8.3% ^[9] (2015 est.)	7.2% ^[19]
GDP composition by sector	Agriculture: 16.3% Industry: 32.7% Service: 40.9% ^[13] (2016 est.)	Agriculture: 11.3% Industry: 41.4% Service: 47.3% ^[9]	Agriculture: 4.2% Industry: 32% Service: 63.8% ^[19]
Population living below poverty line	13.5 (2014 est.) ^[12]	-	-
Human Development Index (HDI)	0.683 (rank 115/188) (2015 est.) ^[14]	-	-
Government type	Socialist market-oriented state	-	-
Governance capacity	-0.34 (rank 41.4%) ^[15]	-	-

2.2. Cu Lao Cham Marine Protected Area (CLC-MPA)

The CLC archipelago lies in the Central Coast of Vietnam and 18km offshore from Hoi An city of Quang Nam province. Its surrounding waters are home to 282 coral species (including 261 species of hard corals) and five seagrass species that spread over an area of 0.5 km² [20,21,22]. Coral reef and seagrass habitats provide ideal nursery and breeding grounds for 270 reef fish, 97 mollusc species and 11 species of echinoderms. Notably, the reef-associated spiny lobsters have been a primary income source for many CLC fishers [21]. The MPA designation is thus instrumental to protecting CLC's biological wealth and securing sustainable livelihoods. In 2005, with significant support from the Danish government, Quang Nam province designed CLC as an MPA with a total area of 235km². In 2009, CLC-MPA was demarcated as a core zone of the UNESCO Hoi An–Cu Lao Cham Biosphere Reserve (HA–CLC BR) to promote the harmonisation of biodiversity conservation and sustainable development in CLC in the broader context of Hoi An city and its estuary (Fig. 2).

At the MPA designation stage, fishing was a primary source of income and subsistence for more than 80% of CLC households [23], most other people engaged in farming and collecting firewood, forest leaves and land crabs for subsistence [24]. CLC bird's nests provide a lucrative trade for luxury traditional food but are exclusive to a state-owned enterprise that did not employ any CLC residents and economic benefits were mostly accrued to the city government. Lacking communication and electricity supplies, CLC people were relatively isolated from the mainland. Fish were the only exported goods, which were often sold to seafood traders at sea. Typhoon season (September-February) made CLC even more isolated. CLC people thus developed a habit of storing imported foods for months before storms set in, while fish could be caught on coracles for daily consumption. Therefore, fishing was imperative to CLC people given that fish were abundant and open access. Local facilities (schools, medical care, etc.) in CLC were also limited, leading to the low educational level of CLC residents. Currently, about 3000 people (clustered in two villages) reside on the islands within the MPA (Fig. 1.).

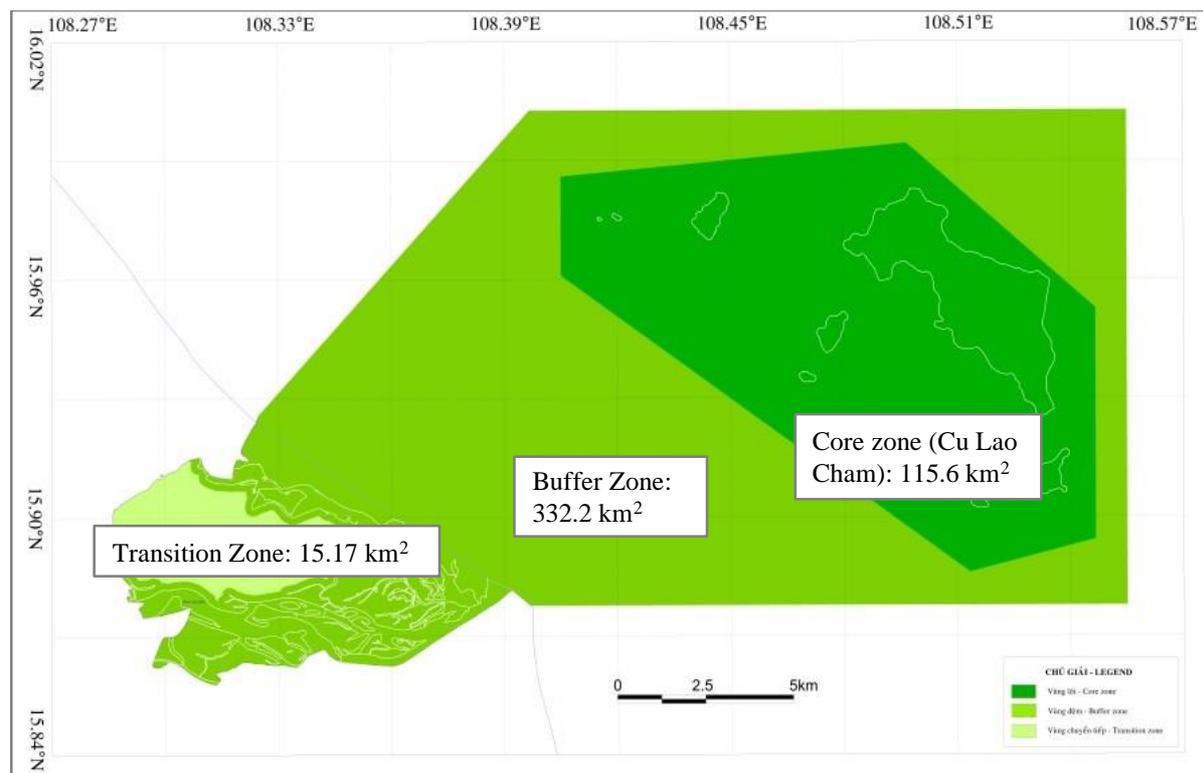


Fig. 2. Zoning map of Hoi An-Cu Lao Cham Biosphere Reserve (Source: Map courtesy of CLC-MPA Authority).

CLC-MPA exists in a context of precious historical and cultural values but also a rapidly changing economy. The MPA was initially managed by Quang Nam province, of which the economy primarily focuses on the industry sector [25] (Table 3). However, being located close to Hoi An city, the MPA is more influenced by Hoi An's

Khuu TD, Jones PJS and Ekins P (in press) A governance analysis of two MPAs in Vietnam: Nha Trang Bay and Cu Lao Cham. *Marine Policy* 104330, doi:10.1016/j.marpol.2020.104330. One of 20 papers in a special section of 28 case studies on [MPA Governance](#)

tourism-based economy. Since the designation of Hoi An UNESCO World Heritage site in 1999, the number of tourist arrivals in Hoi An has continuously increased. In 2015, tourism contributed 68% to Hoi An's economy. Consequently, CLC's socio-economic structure has transformed substantially, with tourism gradually taking over from fisheries. The designations of CLC-MPA and HA-CLC BR between 2005 and 2009 are critical to such transformation. Notably, 'world heritage' title has driven the increasing number of tourists in both Hoi An and CLC-MPA. Between 2012 and 2015, GDP contribution by CLC's agriculture sector reduced from 70% to 20% while that by service sector increased from 30% to 70% [26]. As such, the socio-economic structure of CLC has typical characteristics of coastal communities in a transition with two core components — i.e. the subsistence economy based on local resource uses and a market-oriented economy focusing on services provided for tourism development and trading of local resources.

Table 3 Local socio-economic development scenarios surrounding CLC-MPA.

Metric	Vietnam	Quang Nam province (2016 estimates)	Hoi An city (2016 estimates)
Population per km ²	308 ^[12] (2017 est.)	141 ^[25]	1483 ^[25]
GDP per capita	US\$ 2,343 ^[12] (rank 132/184, 2017 est.)	US\$ 2,190 ^[25]	US\$ 1,622 ^[25]
GDP growth rate	6.8% (2017 est.) ^[12]	14.7% ^[25]	13% ^[25]
GDP composition by sector	Agriculture: 16.3% Industry: 32.7% Service: 40.9% ^[13]	Agriculture: 11.7% Industry: 67% Service: 21.3% ^[25]	Agriculture: 8.2% Industry: 22% Service: 69.8% ^[27]
Population living below poverty line	13.5 (2014 est.) ^[12]	11.13% ^[25]	0.43% ^[26]
Human Development Index (HDI)	0.683 (rank 115/188) (2015 est.) ^[14]	-	-
Government type	Socialist market-oriented state	-	-
Governance capacity	-0.34 (rank 41.4%) ^[15]	-	-

3. Objectives

3.1 NTB-MPA

NTB-MPA was established to enhance management capacity for the Ministry of Fisheries and other authorities in governing MPAs, and build cross-sectoral coordinating mechanisms for the management of marine and coastal resources [10], also providing for the co-management model developed in NTB-MPA to be applied to other MPAs in Vietnam. The conservation and operational objectives of NTB-MPA are outlined in Table 4. Daily management activities in NTB-MPA are guided by the 'Temporary Zoning Management Regulations' [28] that legitimise NTB-MPA's zoning plan (Fig. 1) and its associated regulations. No-take zones (NTZs) occupy about 10% of NTB-MPA area [29].

Table 4 Objectives and related management actions for NTB-MPA [29]. See Jones and Long [3] for explanation of categorisation

Conservation	Operational
To conserve a representative example of internationally significant and threatened marine biodiversity.	<ul style="list-style-type: none"> To work in partnership with MPA stakeholders to effectively protect and manage the marine biodiversity of NTB-MPA as a model for collaborative MPA management in Vietnam. To develop a functional zoning system. To enforce MPA regulations via patrolling and surveillance. To install and maintain the mooring buoy system for tourist boats. To raise awareness and conduct environmental education. To promote and implement community development activities. To improve livelihoods for local people. To develop sustainable financing mechanisms for MPA operation. To build institutional capacity and cross-jurisdictional mechanisms. To establish MPA regulations and issue permits to certain economic activities.

3.2 CLC-MPA

CLC-MPA was designated as a multiple-use MPA with total area of 235km², of which 0.54% is comprised of 14 dispersed and small NTZs (IUCN category Ia – strict nature reserve [30, 31]) and 0.96% of which is comprised of three ecological rehabilitation zones (IUCN category Ia – strict nature reserve [31]). The CLC-MPA management plan of 2009–2013 articulated the overarching objective with a focus on protecting six features—i.e. coral reefs, seagrass beds, spiny lobsters, limpets, land crabs, and sandy beaches [32]. The revised management plan of 2014–2018 expanded the list of protected features to include abalones, pen shells, giant clams, giant tritons, and ornamental fish [Table 5] [33].

Table 5 Objectives and related management actions for CLC-MPA [33].

Conservation	Operational
<ul style="list-style-type: none"> To conserve natural resources, environment, and biodiversity. 	<ul style="list-style-type: none"> To sustainably exploit and promote the values of CLC-MPA. To improve the lives of local communities living in and around the MPA serving for sustainable socio-economic development. Institutionalisation: developing environmental protection regulations for beach management; establishing protection-exploitation groups; zoning plans. Publicity and awareness raising. Scientific research. Alternative livelihood programmes via community surveys, vocational training, micro-credit programmes, local eco-tourism services, etc. Surveillance and monitoring. Environmental protection: removing COTs, beach cleaning, constructing a sewage treatment plan, etc. Sustainable financial mechanisms. Sustainable tourism development: raising awareness and capacity building for local citizens, installing mooring buoys and signboards, proactively participating in reviewing of tourism development projects with local authorities.

4. Drivers/Conflicts

Having been developed under an immature regulatory framework in a context of rapid economic growth, both MPAs have been critically challenged by the impacts from unsustainable economic development activities, notably mass tourism, overfishing, coastal development and pollution.

4.1. Mass tourism

Since the reform of 1986, natural resources-based economic growth has led to the rapid growth of Vietnam's tourism sector, featured by a sharp increase in tourist arrivals and over-development of tourism infrastructure along Vietnam's coastline. In both MPAs, tourism activities are typically intensified and inappropriately managed. In NTB-MPA, tourism had already been promoted before the designation of NTB-MPA through the promotion of Hon Mun Island as 'Hon Mun marine park' with a lack of legal status and funding for conservation [34]. This situation exacerbated overfishing because local fishers had attempted to catch as much as possible before the enactment of MPA formal institutions [35]. Then the designation of NTB-MPA added to the province's tourism development. During 1995–2015, the number of tourists in Khanh Hoa grew significantly (Fig. 3), primarily due to the improved living standards and desire for marine tourism of the Vietnamese middle-class and unleashing immigration and visa restrictions for foreign tourists. Although NTB-MPA encompasses nine islands, the management capacity of NTB-MPA Authority is only focused on the NTZ of Hon Mun island, in which fishing is technically banned but which permits all recreational activities, including scuba diving, snorkelling, coral watching on glass-bottom boats (run by businesses) and glass-bottom coracles (run by local fishers), and welcomes all tourist boats in unlimited numbers. The overcrowding of tourists thus happens daily and is worsened by the lack of tourists' environmental awareness. Recently, the composition of foreign tourists has been dominated by Chinese and Russian visitors, who often favour crowds and tend to have minimal knowledge and responsible behaviours towards the environment [36]. The consequences include stamping on or breaking coral reefs and littering on the beaches or in the sea. Such behaviours are reinforced by narrow-minded tourism operators who frequently claim themselves as being 'green' with no environmental credentials.

Except Hon Mun, NTB-MPA Authority has almost no jurisdiction over other islands. Particularly, in Hon Tam Island, a permit to develop a sea-walking (helmet diving) service was granted to a corporation despite foreseen ecological impacts of such a service. Besides, many other recreational activities (parasailing, jet skiing, diving to catch pearl oysters, etc.) are allowed in Hon Tam [2]. Meanwhile, theme parks, golf courses, villas, resorts, a cable car system and other tourism developments have mushroomed throughout NTB-MPA. The effects of unknown environmental impacts might be paramount and irreversible as most developments have taken place in coral reef and seagrass bed areas [38]. By law, all development projects must provide an Environmental Impact Assessment (EIA) before implementation. However, the application of EIA has not been respected by developers and regulators, and undertaking and assessing them has been alleged to often involve some degrees of rent-seeking. Although tourism development has provided local communities with new employment opportunities, particularly labour-intensive jobs in the construction of infrastructure, these short-term and seasonal jobs are insufficient to compensate for the loss of access to resources. Furthermore, during 2001–2015, three fishing villages on Hon Tre Island were relocate to the mainland for tourism development, with a minimal amount of compensation for the loss of land and sea use rights for the displaced traditional fishers.

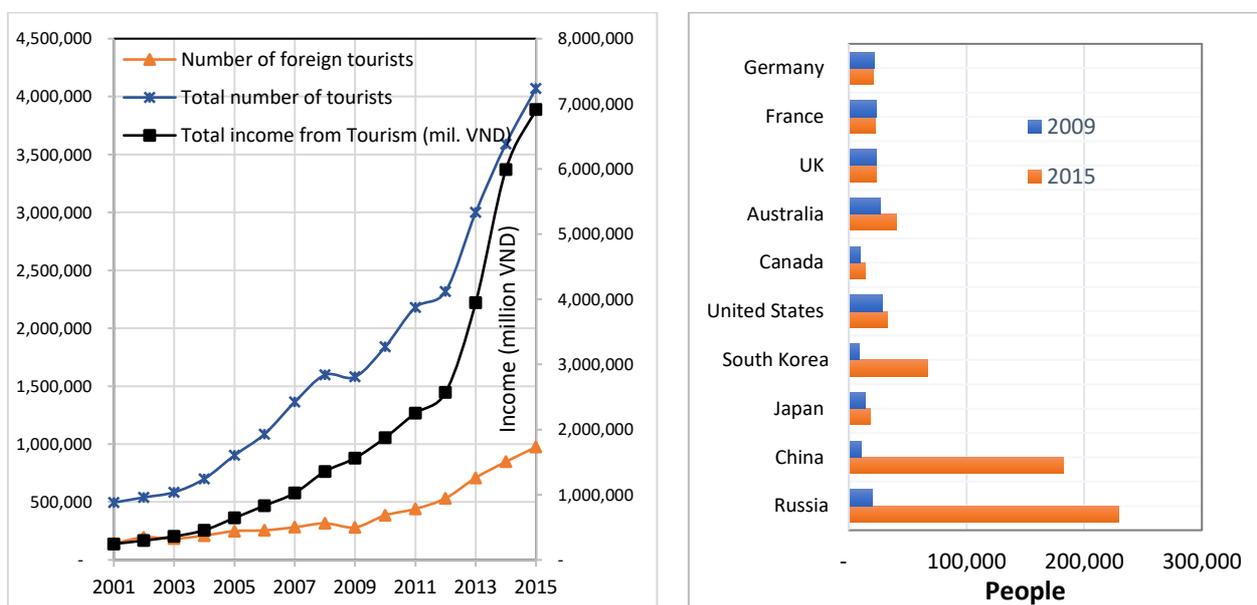


Fig. 3. Number of tourist arrivals to Khanh Hoa province period 2000-2015 and Tourist arrivals in Nha Trang city by country of origin. Source: [9, 38].

In CLC-MPA, from 1999 to 2006, the number of tourists increased sharply from 600 to 10,000 [24]. In 2015, the total number of tourists hit 400,000 [26]. Tourism activities in CLC-MPA share the same characteristics with those in NTB-MPA – overcrowding and unsustainable tourism activities. Overcrowding not only pressures on CLC’s ecosystems but also causes environmental issues to local communities. Overcrowding has also led to a shift in the demographic composition of tourists. Tourists in CLC-MPA are now dominated by Chinese and Vietnamese tourists who are widely seen as having limited environmental knowledge and behaviours. The most popular form of marine recreation in CLC is snorkelling, which is provided in all-inclusive package tours by tourism operators based in Hoi An city. In 2014, about 32% of tourists participated in snorkelling (Fig. 4), and most of them had little experience. Therefore, breaking and collecting corals happens frequently. Scuba diving, which is favoured by experienced tourists with greater awareness of the marine ecosystems, is less popular in CLC, arguably due to overcrowding of tourists and the degraded states of coral reef areas. Subsequently, all-inclusive package tours have prevailed with the number of tourist boats increasing considerably from six to 150 boats between 2005 and 2015. This form of mass tourism was clarified as providing the lowest benefits for local communities and weak incentives to promote conservation of marine ecosystems [39]. Particularly, a day tour package costs about US\$25–\$30 per person (including a US\$2 MPA user fee that is paid to Hoi An city) [40].

Besides, many of these tourists spend more time on the beach and at beachfront seafood restaurants rather than diving, snorkelling, or interacting with local communities. Tourism growth in CLC has also driven the growing demand for local resources, leading to the increasing pressure on conservation features and reliance on imports to compensate for the loss of ecosystems. Although tourism-related jobs (homestays, seafood restaurants, etc.) have generated new types of income for local communities, this has arguably benefited a few well-connected people, leading to the reinforcing of social inequity problems. Meanwhile, the impacts of rising amounts of waste and shortages of water are being borne by local communities.

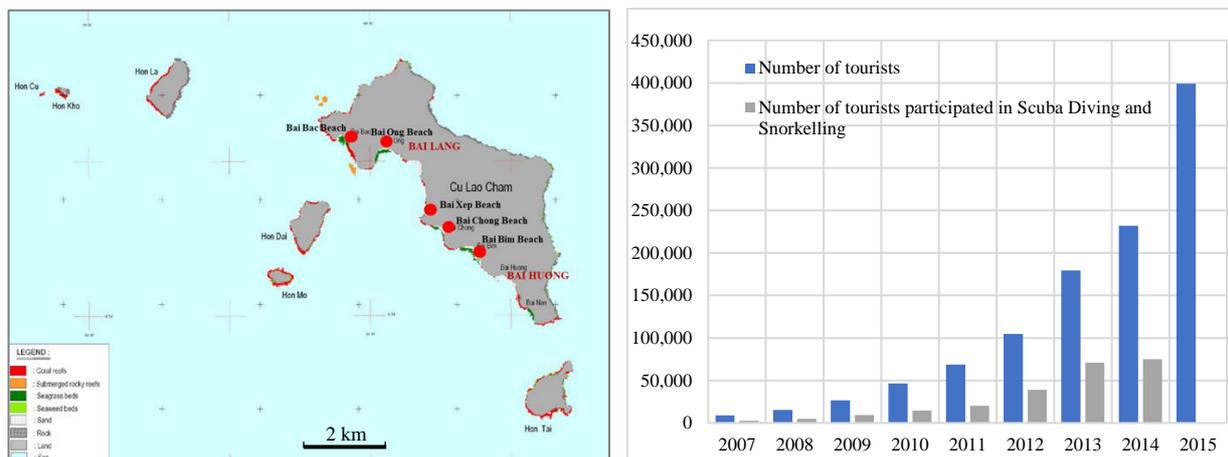


Fig. 4. Beaches planned for tourism development in CLC-MPA and Number of tourists to CLC-MPA during 2007-2016 (Map and data provided by CLC-MPA Authority).

In summary, considering the concept of ‘tourism area life cycle’ in which a tourist destination is presumed to go through several stages starting from exploration, through development, then consolidation, and ending up with stagnation and declining stages [41], it is very likely that NTB-MPA is in a stagnation stage, in which natural and cultural attractions have been replaced by imported facilities and increasing the dissatisfaction of visitors in overcrowded and degraded environments. CLC-MPA is also seemingly heading towards a stagnation stage. Given that the tourism sector is now overtaking fisheries in many coastal communities in Vietnam, it is essential to adopt measures to promote sustainable and responsible tourism to ensure the health of ecosystems and sustainable livelihoods for local communities.

4.2 Small-scale fisheries

Since the economic reform of 1986, Vietnam’s fisheries sector has increasingly focused on exports, with the government continuously providing state subsidies for upgrading fishing vessels. Fishing activities in NTB-MPA are intense and weakly controlled. At the MPA designation, artisanal fishing was prevalent. NTB traditional fishers often fished on small boats with a wide range of methods, including hook-and-line, hookah diving, purse seine with lamp, trammel net, lift net with lamp and driftnet [42]. The most influenced group by NTZ regulations were the group of over 300 poor fishers who participated in cyanide and dynamite fishing [10]. Since 1997, the vessel upgrading subsidies have resulted in a significant increase in the number of big offshore fishing boats in NTB-MPA. This policy, however, has conditioned offshore boats, either owned by local or incoming fishers, to fish illegally in NTB-MPA, subsequently leading to the intensifying pressure on NTB’s resources and habitats, and the increasing competition between incoming and local fishers over the dwindling resources. Meanwhile, despite the NTZ regulations, the populations of many commercially valuable reef fish (e.g. large groupers) have declined sharply. Cyanide fishers are now chasing after small ornamental fish to supply to aquariums in NTB’s tourism-recreation complexes, and juvenile lobsters for local aquaculture production. Despite such worrying trends, fisheries statistics (provided by the Department of Agriculture and Rural Development – DARD) are far above which could provide for sustainable fisheries management as the catch by unregistered boats, subsistence and recreational fishing has frequently been missed or ignored. Therefore, it is arguable that the designation of NTB-MPA has exacerbated the scenarios of resource depletion by boosting tourism development while having inadequate capacity to address growing fishing pressures.

Like NTB-MPA, fisheries in CLC are small-scale, nearshore, multi-gear and multispecies. The widely caught species are lobster, sea cucumber, grouper, snapper, squid, tuna, anchovy and mackerel [43]. Gillnets, lift-nets and long lines are the three most commonly used gears [44] of which the use varies with seasons and fishing grounds. At the time of MPA designation, more than 80% of CLC households depended on fish for subsistence. About 70% of local fishing effort focused on the radius of 0.3–2km from the CLC shoreline using hand-lining, small lift-nets and gill nets. The reef areas of 0–0.3km from the CLC shoreline were fishing grounds for 14% of CLC fishers (mostly hookah divers) who were considered the most influenced by NTZ regulations. The intertidal zones were also where children and women gleaned limpets and snails [43]. The MPA designation and impacts of tourism have gradually transformed local resource use patterns. During 2005–2011, the number of boats and coracles decreased by 23%, leading to a 41% decrease in CLC's annual fish catch [45]. Due to the growing demand for local seafood from tourism, the local catch is now limited to household consumption, while a large proportion of fish supply for tourists in CLC has been imported from the mainland or purchased from incoming fishers who illegally fish in CLC waters. The participation of CLC residents in fishing also reduced from 46% to 31% during 2004–2011 [45]. The key drivers of such changes are the depletion of fish stocks, tourism growth in CLC and Hoi An and the high levels of risk and uncertainty posed by fishing. Currently, a majority of CLC fishers are in their middle-age, which discourages them from going further offshore and disadvantages them in the competition with the young, skilful and ambitious fishers from outside CLC [2]. In such circumstances, purchasing the catch from incoming fishers is a rational choice because local fishers do not need to put much effort into competing with outsiders whereas incoming fishers often prefer selling their catch in CLC at the lower-than-market price to offset the money and energy spent on preserving and transporting the catch at their home port. However, this resource exploitation pattern could destroy CLC marine ecosystems faster than traditionally more sustainable fishing practices because incoming fishers tend not to hold stewardship values for local resources and often use bigger boats with more efficient and destructive methods (e.g. pelagic trawlers) [2].

4.3 Other impacts

4.3.1 Unregulated Aquaculture

Unlike CLC-MPA, where aquaculture is challenged by harsh weather, NTB-MPA has intense, unplanned, and uncontrolled aquaculture activities which were once a supplementary livelihood to fishing [11,46, 47]. The most farmed species were spiny lobsters, groupers and snappers that strongly relied on the capture of wild fish juveniles for fry supply, thus adding to the intensifying pressure on NTB conservation objectives. Recently, due to the relocation of MPA villages for tourism development, the cultured sites have been condensed, leading to disease outbreaks and the conversion of farms into floating restaurants that operate illegally in the MPA. The remaining lobster cages now depend on fry supplied from Indonesia due to the lower costs and the depletion of native juvenile lobsters. Waste from floating restaurant and aquaculture operations are discharged directly into the sea [48].

4.3.2 Coastal development and pollution

In NTB-MPA, the coastline is densely packed with hotels, bars and restaurants, with a lack of strategic development planning and little concern for the environment, leading to water pollution and runoff problems. Also, NTB waters have been increasingly polluted by oil spills and waste discharged directly from intensified activities of commercial and tourist ports, fishing and tourist boats [2]. Although the recent NTB water quality survey showed that the indicators are still within a safe range of the Vietnam Environmental Standards, there were some warning signs of high organic and bacteria loading that could harm NTB's critical habitats [48]. For CLC-MPA, despite the Biosphere Reserve title, two major developments were allowed to occur within CLC-MPA. First, a road encircling Hon Lao Island constructed for military purposes caused rockslides, erosion, the reduction of forest coverage and the degradation of coral reefs in some areas [2]. Second, the 70-bungalow resort development by a corporation, involving land/sea encroachment that has severely affected CLC's landscape, seascape, and ecosystems. CLC water quality is also critically affected by the nutrient loads from Thu Bon estuary that are fed by the intense coastal development in Da Nang and Hoi An [49]. CLC-MPA has no wastewater treatment facilities. Wastewater from local uses, fishing and tourist boats are discharged directly into the sea. Recently, the impacts on CLC's marine environment have been more observable through some mild algal bloom events.

5. Governance

5.1 Governance of NTB-MPA

NTB-MPA has a decentralised governance framework [1, 3] in which the MPA is led by the government with responsibilities significantly being decentralised to the provincial and district levels. The key user groups involved in governing NTB-MPA are international donors, NGOs, central government, Khanh Hoa Provincial People's Committee (KH-PPC), Nha Trang City People's Committee (NT-CPC), tourism developers and operators, NTB-MPA Management Authority, local communities, and other local authorities. The MPA was designated in the context of Vietnam being a centralised communist state that is in a transition towards a market-oriented communist state with a series of decentralising state management responsibilities (including those related to natural resource governance) to provincial/district governments. The central government has confined its role to reviewing and approving long-term socio-economic development plans for provinces under the tight supervision of the Vietnamese Communist Party (VCP) to make sure that such plans are consistent with the VCP's direction – i.e. political stability and rapid socio-economic growth. In such a context, NTB-MPA's donor-influenced collaborative governance framework has shifted significantly. There are three distinct phases in NTB-MPA's governance:

2001–2005: As prescribed by international donors, governing NTB-MPA was framed by collaborative decision-making with significant involvement of the central Ministry of Fisheries (MOFi that was merged into the Ministry of Agriculture and Rural Development (MARD) in 2007) and foreign experts. Collaborative platforms were established along the state hierarchy. These include MPA village committees, Community Consultation Group (CCG), Provincial Steering Committee (PSC) to promote coordination at the provincial level, the National Steering Committee (NSC) that facilitated the collaboration between central ministries, the PSC, HM-MPA team, MPA director, scientists and donors [10]. When donor-funding ended in 2005, all MPA management responsibilities were handed over to KH-PPC. NTB-MPA was then legalised by a provincial decision, NTB-MPA Authority then being institutionalised as a provincial revenue-generating body to oversee NTB-MPA's daily operation.

2005–2012: The established collaborative platforms were weakened by insufficient economic support. Since the efficiency of the grassroots democratic policy was always being questioned [50, 51], community participation in NTB-MPA was limited to passive participation, with only a few key connected individuals involved. Also, the new Fisheries Law of 2003 [52] pushed forth the decentralisation of fisheries and MPA management responsibilities to localities with insufficient resources for effective management [53, 54], while the new Land Law of 2003 also gave provinces more decision-making power over local land uses. As such, KH-PPC gained more autonomy over its natural resources with no upward accountability for ensuring sustainable resource exploitation. Consequently, since 2004, vast areas of land and sea within NTB-MPA have been allocated to tourism corporations, leading to the commanded relocation of local communities. As a non-administrative agency, NTB-MPA Authority had no decision-making influence over other provincial departments. Under an unclear legal framework, the sharing of responsibilities and benefits between NTB-MPA Authority and these authorities was unclear. Also, since the donor-funding ended, the involvement of these authorities in NTB-MPA became limited. NTB-MPA Authority was then in a weak political position to promote cross-jurisdictional coordination and influence higher-level decision-makers. Meanwhile, with no accountability for achieving MPA conservation objectives, NTB-MPA Authority has rather focused on generating income from MPA user fees. Under such circumstances, the inclusion of NTB-MPA into Nha Trang National Heritage Area in 2005 was expected by many scientists to provide for a stronger legal basis for biodiversity conservation, with NTB-MPA being attached to three national laws – the national Law on Cultural Heritage of 2001 [55], Environmental Protection Law of 2005 [56], and Biodiversity Law of 2008 [57]) – and an EIA being a prerequisite for obtaining a development permit. However, the focus of local, municipal and provincial governments on economic development and a lack of oversight by the related central ministries has led to many projects bypassing the need for an EIA. This situation has led to overdevelopment and the increasing lack of control over tourist activities within NTB-MPA and Nha Trang city.

2012–present: in 2012, the NTB-MPA Management Authority was decentralised to the city government (NT-CPC) while the management activities were expanded to overseeing the NTB National Heritage Area [58] (Fig. 5). The weaknesses in NTB-MPA's governance framework have been exacerbated, with more duties being assigned to NTB-MPA Authority that already has weak management capacity. Although KH-PPC formed a

coordinating mechanism to solve the growing disputes amongst local authorities and assign them a shared duty in protecting NTB's environment, KH-PPC provides limited financial resources to support such a mechanism.

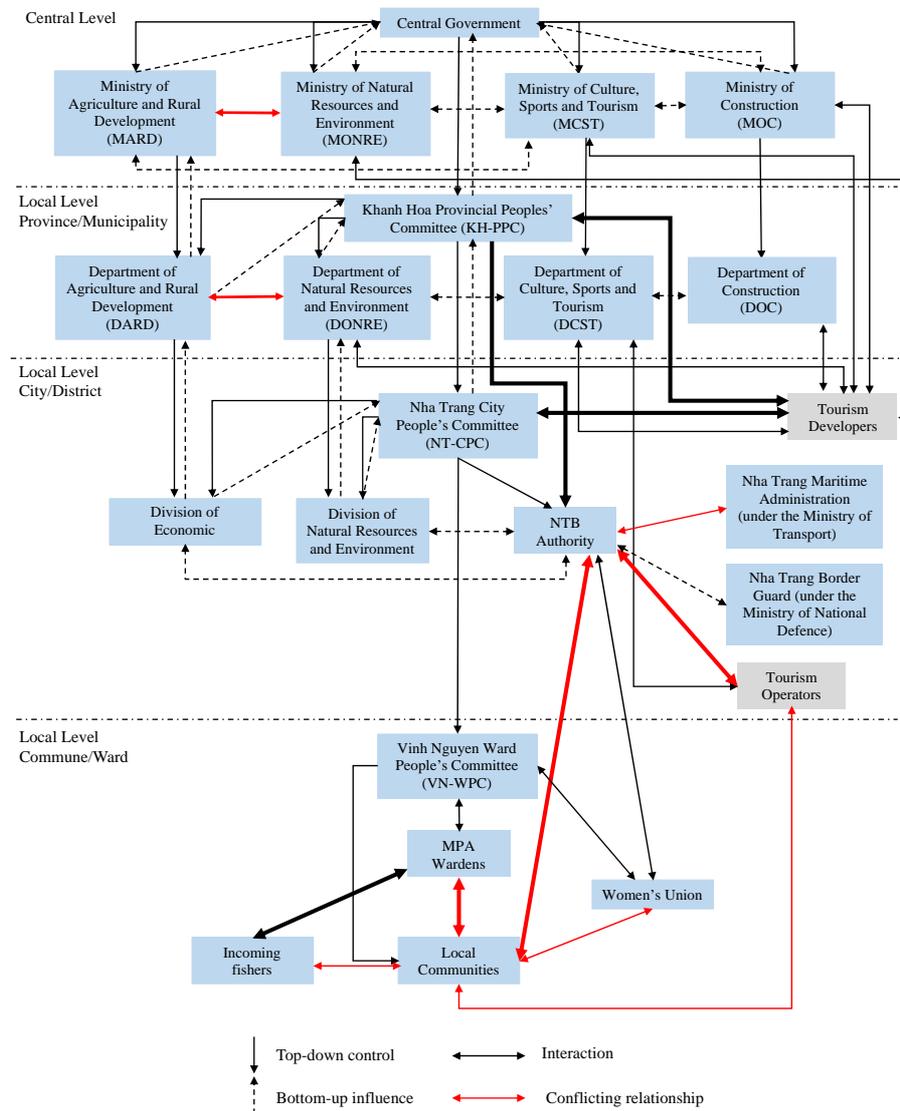


Fig. 5. Governance framework of NTB-MPA (bold arrows illustrate strong interactions).

5.2. Governance of CLC-MPA

Like NTB-MPA, CLC-MPA has a decentralised governance framework, with key stakeholders being the central government: MARD and MONRE, Quang Nam Provincial People's Committee (QN-PPC), the provincial agency of MARD (DARD) and MONRE (DONRE), Hoi An City People's Committee (HA-CPC), CLC-MPA Authority, Tan Hiep Commune People's Committee (TH-CPC), tourism operators/developers, the border guard (under the Ministry of National Defence), and local communities (Fig. 6). CLC-MPA was designed to replicate the co-management model that had been piloted in NTB-MPA. Accordingly, the MPA objectives, zoning, and management plan were developed with stakeholder participation. At the community level, collaborative structures (MPA club, village MPA boards, etc.) were formed to promote community engagement in MPA governance, with the significant involvement of TH-CPC. Like NTB-MPA, the governance structure of CLC-MPA has changed considerably with the dynamic socio-economic context. CLC-MPA Authority was founded in 2006 as a provincial revenue-generating agency to oversee daily activities in CLC-MPA. Nonetheless, QN-PPC held decision making power over almost everything in CLC, including zoning regulations, management planning, managing MPA user fees, annual MPA operation budget, and permitting construction projects conducted within CLC. Therefore, CLC-MPA

Authority had neither mandate to make decisions over its operation nor power to influence decisions over development projects within CLC. In daily management, CLC-MPA Authority horizontally relied on cooperation by other provincial agencies, e.g. DARD for fisheries management, the Department of Culture, Sports, and Tourism (DCST) for tourism management, the commune police and border guard for sea patrolling and handling of violations; etc., with limited effectiveness given the lack of influence and relation cross-jurisdictional coordination mechanisms made available to the CLC-MPA Authority.

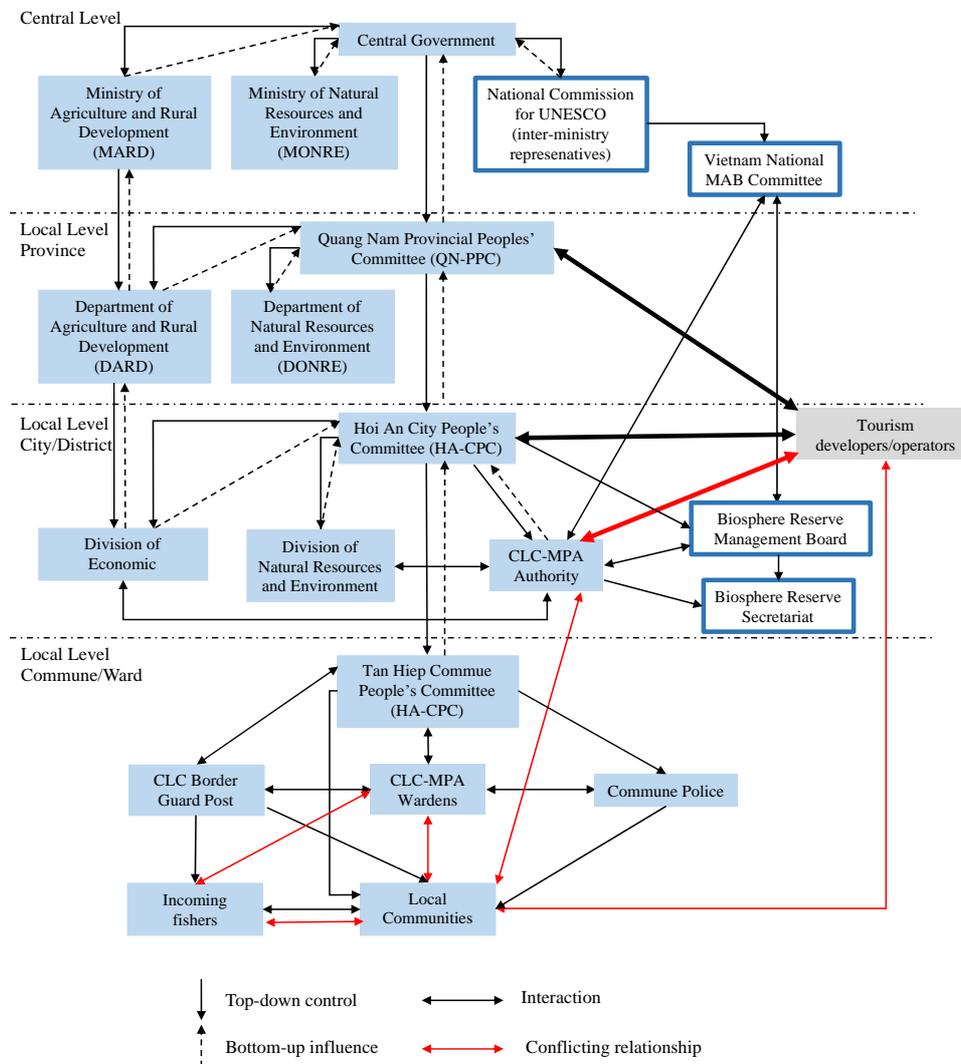


Fig 6. Governance framework of CLC-MPA (bold arrows illustrate strong interactions).

Following the Biosphere Reserve designation in 2009, some interactions between the National MAB committee (under the National Commission for UNESCO), CLC-MPA Authority, QN-PPC and HA-CPC were established to oversee HA-CLC BR area. Subsequently, HA-CPC established the part-time HA-CLC BR Management Board, which is led by the HA-CPC chairperson and comprised of representatives from HA-CPC divisions, communes/wards, and other related local authorities to promote cross-jurisdictional coordination. The connection between HA-CLC BR and CLC-MPA is promoted by the Biosphere Reserve Secretariat under CLC-MPA Authority. These interactions and structures are relatively weak because BRs have no legally binding obligations, despite being a global initiative, reliant largely on political will to be effective. Generally, the implementation of BRs in Vietnam has been challenged by unsustainable financial resources, weak legal status, lack of community participation and limited awareness and communication [59]. HA-CLC BR is no exception. Although a sense of international entitlement has contributed to gaining political support and some short-term NGO-funded projects, it has contradictorily facilitated the current state of mass tourism development in CLC. In

2013, the management of CLC-MPA was further decentralised to HA-PPC, leading to significant weaknesses in its current governance framework.

6. Effectiveness

Based on the MPAG effectiveness scale [1, 3], the effectiveness of NTB-MPA is around score 0 – ‘*No use impacts addressed; MPA designation may even have increased impacts by undermining previous governance institutions*’. The effectiveness of CLC-MPA is around score 2 – ‘*Some impacts partly addressed but some impacts not yet addressed*.’

6.1. NTB-MPA

Vietnamese scientists have evaluated the management effectiveness of NTB-MPA using four ecological indicators, i.e. increase in live coral cover, no decrease in mangrove and seagrass cover, increase in the productivity of target fish and shellfish, and no reduction of endangered species. Drawing on some biodiversity and habitat surveys, by 2015, apart from the increased area of mangrove forests in Hon Tre after replanting in 2004, most indicators were degrading [37, 60, 61, 62]. Although the live coral cover in Hon Mun NTZ, where management capacity is focused, was relatively high (~42%), it was extremely low in other uncontrolled NTZs (~3.2%) and coral scars, high densities of crown-of-thorns starfish and evidence of cyanide fishing have increasingly been observed [37, 60]. Consequently, the average density of reef fish of high commercial value was critically low (e.g. < 0.5 groupers/500m³). Endangered species (hawksbill turtles, giant clams, etc.) are declining [37]. No spill-over effects from the NTZs were observed [63]. Although the impacts of tourism development on NTB’s habitats had not been assessed, coral reefs and seagrass beds in some ecological rehabilitation zones were observed being degraded or removed by sedimentation and sea encroachment [37]. Besides overdevelopment, overcrowding of tourists and uncontrolled tourism activities reflect the inability of NTB-MPA in addressing the impacts of mass tourism development. Despite a decrease in aquaculture production, due to the disease outbreaks and loss of profit rather than MPA regulations, pollution from cultured cages remains problematic. Dynamite fishing in NTB was reduced significantly due to harsher punishments under the new Fisheries Law, but other destructive fishing practices are still endemic, e.g. cyanide fishing and pair trawlers, despite being forbidden by law. Also, big offshore fishing boats often fish within the bay. Given the increasing number of offshore fishing vessels based in NTB-MPA and depleted fish stocks in Khanh Hoa sea, offshore vessels here are often observed fishing illegally in other MPAs along the Central and Southern Coasts of Vietnam. Therefore, the spill-over is paradoxically of fishing effort rather than of fish stocks.

6.2. CLC-MPA

The enactment of Fisheries Law of 2003 and MPA designation followed by the UNESCO Biosphere Reserve title of 2009 have together addressed some localised impacts of destructive fishing and coral mining, but have also led to more destructive impacts caused by mass tourism and incoming fishers, the NTZ area being too small (1.26km² of 235km²) for conservation benefits to be likely. So far, CLC-MPA is the only MPA in Vietnam that attempts to self-monitor management effectiveness using annual surveys of coral reefs, water quality, alternative livelihood programs and the number of violations. The recent Reef Check surveys show that coral reefs were in fair condition with about 50% live coral cover [44]. However, the density of commercial fish, especially groupers, spiny lobsters and grunts, decreased dramatically, especially groupers over 30cm in size, which have disappeared. CLC fishing logbooks of 2006–2014 show an increase in CPUE of boats using gillnets targeting reef fish and a slight decrease in CPUE of boats using lift nets targeting small pelagic species [64] (Fig. 7). Tourism impacts on ecosystems (collecting reef fish, trampling on corals, breaking corals, etc.) have become more evident. The CLC biodiversity surveys coincidentally show that the rubble content (dead corals) in CLC increased from 3% (2004) to 7% (2011) indicating the increasing intensity of coral damaging activities [22]. Indirect impacts of tourism (dumping of waste and demand for local resources) are also growing. As locals have relied more on imports of fish or the catch from incoming fishers to feed tourists, the number of violations by incoming fishers has increased notably (Fig. 8).

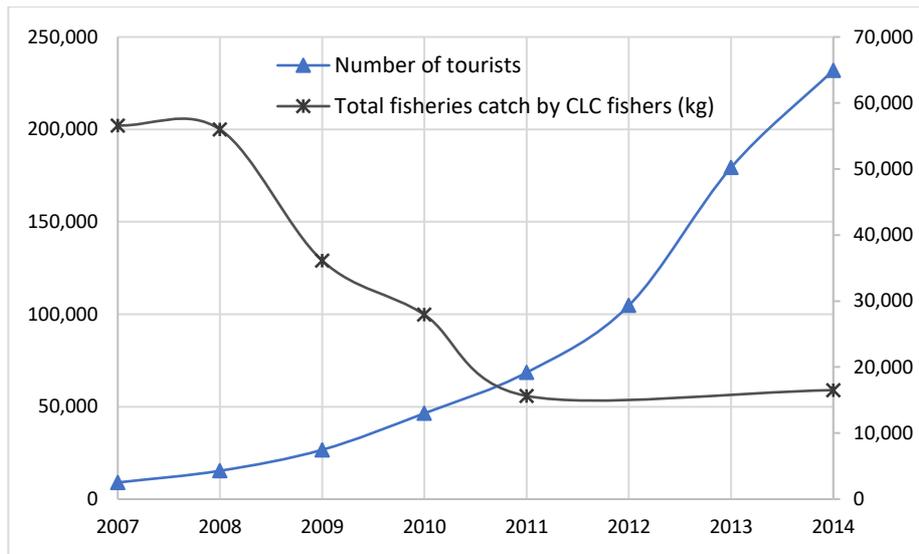


Fig. 7. Number of tourists to CLC-MPA and total fisheries catch by CLC fishers (kg).

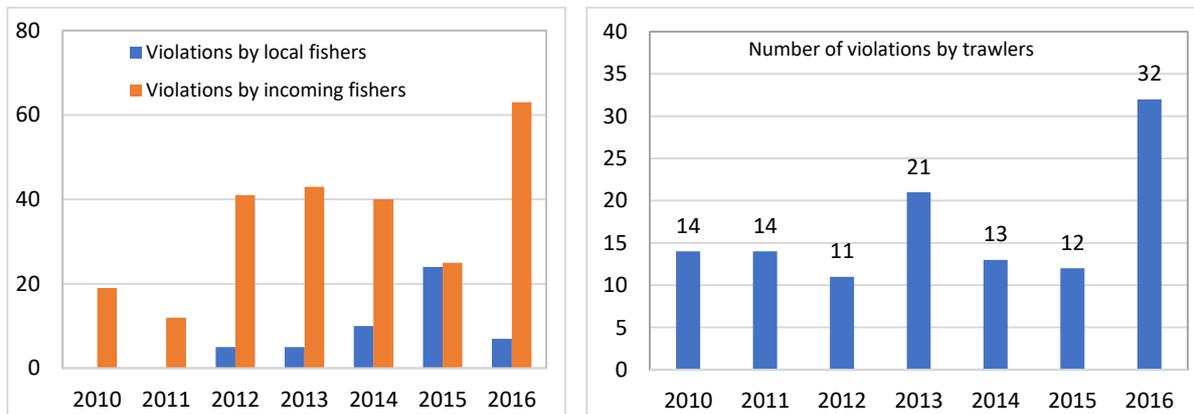


Fig. 8. Number of violations detected in CLC-MPA during 2010-2016 (Data provided by CLC-MPA Authority).

7. Incentives

To provide for a sound MPA co-management model, NTB-MPA and CLC-MPA have used a combination of incentives from all five governance incentive categories as presented in Table 6 [1, 3]

Table 6

Summary of Incentives applied in NTB-MPA and CLC-MPA (Y) including those that are particularly important priorities for strengthening (Y*) and introducing (N*) (more detailed tables are provided in Supplementary Material)

Incentive	NTB-MPA		CLC-MPA	
	Used	How/Why	Used	How/Why
Economic				
i2. Assigning property rights	Y*	Property rights (both land and sea) were assigned to tourism developers with no conditions attached.	Y*	To promote sustainable uses, a 19km ² sea area was assigned to a group of 12 local fishers without environmental performance standards attached.
i3. Reducing the leakage of benefits	N*	Tourism development has caused the loss of land and resource access to local fishers while providing no benefit to them. Also, NTZs have been opened for cyanide fishing by outsiders due to insufficient enforcement capacity.	Y*	Direct employment in tourism is minimal while indirect employment is limited to a few locals (six fishers were employed as MPA wardens). This is insufficient to promote the fair distribution of costs and benefits.
i4. Promoting profitable and sustainable fishing and tourism	Y*	NTZs occupy about 10% of the MPA area that allow sustainable tourism activities and ban all kinds of extraction. Other zones allow compatible uses. However, the ineffectiveness of NTZs has undermined this incentive.	Y*	Zoning adopted an Integrated Coastal Management (ICM) approach. Nonetheless, since NTZs are small and patchy, enforcement is difficult and costly. A re-zoning plan is being designed.
i5. Promoting green marketing	Y*	Hon Mun Island is promoted as 'one of the best diving sites in Vietnam', though the degraded reefs and overfishing undermine this marketing. Community-based tourism was also promoted but mass tourism development has undermined it.	Y*	Land crabs are eco-labelled as a 'green product of CLC' to promote sustainable livelihoods. CLC-MPA has also been promoted as an ecotourism destination while many tourism operators brand themselves as being 'eco' without being certified. The Biosphere Reserve title has been used as a marketing strategy to promote ecotourism.
i6. Promoting diversified and supplementary livelihoods	Y*	Short-term incentives (capacity building, sustainable aquaculture, ecotourism and handicrafts), which were attempted as diversified livelihoods, are insufficient to compensate for the loss of fishing grounds and livelihoods.	Y*	Donor funding supported the implementation of additional livelihoods (e.g. restaurants, motorcycle taxis, homestays, tourist boat operations, glass-bottom coracles, etc.) [41]. However, these livelihoods have arguably contributed to the current trend of mass tourism.
i8. Investing MPA income/funding in facilities for local communities	Y*	Foreign donors provided various sources of funding for upgrading roads, medical stations, public toilets, public markets, etc. However, this funding is undermined by unfair decision-making at the commune level.	Y*	Donor funding was allocated to the construction of garbage collection and treatment system, biogas system, local clinics, etc. The income from tourism is not re-invested in local facilities.
i9. Provision of state funding	Y*	During 2001–2011, the central government provided some co-funding for the two donor-funded projects. Since 2011, the MPA funding has mostly come from tourism income from MPA user fees.	Y*	Since donor-funding ended in 2011, some state funding has been allocated to basic infrastructures and staff salaries but is insufficient to take over from donor-funding and provide long-term strategic funding.
i10. Provision of NGO, private sector and user fee funding	Y*	MPA operation is sustained by MPA user fees (~US\$150,000 per year). NGO funding is sporadic and less integrated into strategic conservation objectives.	Y*	Although income from user fees increased significantly between 2007 and 2015, it is insufficient to cover the costs of biodiversity surveys and regular patrolling (only US\$4,500 is allocated to MPA enforcement yearly). NGO funding is mostly granted to short-term projects.
Interpretative				
i11. Raising awareness	Y*	Use of radio broadcasts, education programmes, video and documentary films, visitor centre and study tours to	Y*	Awareness is raised using community meetings, consultation workshops, brochures, pamphlets, posters, a visitor centre, website, radio and TV

		Southeast Asia for state officials and local users, though these are mostly ineffective due to overreliance on international funding and the over-riding influence of strong tourism development forces.		broadcasting, study tours for local government officials, etc. The marker buoy system was installed to increase fishers' awareness of NTZs. These are mostly ineffective due to overreliance on international funding and the over-riding influence of strong tourism development forces.	
i12	Promoting recognition of benefits	Y*	Focus on raising awareness of the potential benefits of not fishing in NTZs through spill-over/export effects and operating ecotourism, but the ineffectiveness of NTZs has undermined this.	Y	Perception of local fishers regarding CLC-MPA's potential benefits (spill-over/exports, tourism, etc.) has been promoted through awareness-raising and capacity-building programmes. However, these benefits are undermined by ineffective enforcement and growing impacts of incoming users.
i13	Promoting recognition of regulations and restrictions	Y*	Leaflets, website and signboards were used to promote the recognition of NTB-MPA zoning regulations; but none of these are in use now [67, 68, 69].	Y*	Leaflets, website and signboards, and outreach programmes to neighbouring communities are executed. However, due to the recent decentralisation, these have been challenged by a reduction in the institutional capacity of CLC-MPA Authority and a shortage of funding.
Knowledge					
i14	Promoting collective learning	Y*	Collective learning was presented through participatory planning (via community meetings and consultation workshops), participatory biodiversity monitoring (by scientists and community members), and socio-economic assessments using Participatory Rural Appraisal (PRA); all of which are inactive now.	Y*	The small and patchy NTZs reflect that local fishers' opinions were very respected during the planning process. Fishers have also actively participated in biodiversity assessments with scientists and CLC-MPA Authority. A log-book programme is used to encourage the voluntary participation of fishers in recording their catches.
i15	Agreeing approaches for addressing uncertainties	N		Y*	A 120km ² buffer zone depicts a precautionary approach to ensure sustainable fishing practices surrounding the MPA, but this is undermined by insufficient enforcement capacity and shortage of funding.
Legal					
i17	Hierarchical obligations	Y*	The MPA was designated when there was no legislation related to MPAs. Although since 2003 new laws have been enacted with stipulations relevant to the governance of NTB-MPA, but none of these laws seems to be enforceable in NTB-MPA, mostly due to decentralisation-related issues.	Y*	Neither the Biosphere Reserve nor nearby WHS designations carry any obligations for CLC-MPA. The increasing decentralisation has allowed many ways of interpreting national laws at the local government levels leading to MPA obligations being undermined by local socio-economic development and political priorities.
i18	Capacity for enforcement	Y*	Enforcement was undertaken by patrolling boats and a radio communication system. However, the MPA is now too short of funding to run the boats, and the communication system is inoperable. Joint enforcement between MPA wardens, fisheries Inspectors, and border guards rarely happens.	Y*	Joint enforcement between CLC-MPA Authority, the border guard, and commune police is irregularly undertaken (~13–15 times per month). Nonetheless, such local approaches are insufficient to provide for protection against incoming users.
i19	Penalties for deterrence	Y*	Large fines can be imposed for breaching national laws associated with fisheries, environmental protection, and biodiversity conservation. However, due to the lack of enforcement capacity, fines are rarely applied and can be quashed through connections.	Y*	Although joint enforcement contributes significantly to increasing CLC-MPA's effectiveness in enforcing national laws, the number of deterred cases is minor compared to the number of infringements due to insufficient enforcement capacity. Penalties are thus inadequate to deter others and can be quashed through connections.
i20	Protection from incoming users	N*	Incoming fishers often illegally fish in the MPA. Also, the MPA's tourism benefits are mostly captured by the patronage network between the	N*	This incentive needs to be introduced because the number of violations by incoming fishers is higher than that by local fishers, and tourism benefits are captured by incoming corporate companies.

		city/provincial government officials and corporations.			
i21	Attaching conditions to use and property rights, decentralisation, etc.	N*	All user and property rights issued, particularly to tourism developers/operators, need to have performance standards and conditions attached related to the MPA conservation objectives, including social equity issues. Decentralisation to provincial and municipal levels also needs to have conditions attached, with national state oversight.	N*	The property rights assigned to local fishers (E-2) needs to adhere to certain legal obligations to achieve the MPA objectives. Besides, environmental performance standards should be attached to permits/use rights issued to tourism operators/developers. Decentralisation to provincial and municipal levels also needs to have conditions attached, with national state oversight.
i22	Cross-jurisdictional coordination	Y*	Coordination, which was promoted through collaborative structures, failed after donor funding ended. Since NTB-MPA became a district-level MPA, coordination between NTB-MPA Authority and local authorities has been challenged by limited funding and political will.	Y*	CLC-MPA Authority has formed a good coordinating relationship with the border guard and commune police; and it also gives a part of tourism income for the coordination of joint enforcement and information exchange. However, given the impacts of incoming users, the coordination between related city/provincial authorities and between provinces is required to mutually agree on the obligations to comply with CLC-MPA regulations attached to permits issued to incoming fishers and tourism operators.
i23	Clear and consistent legal definitions	N*	The legal framework governing NTB-MPA is fragmented and conflicting. There are also confusions between NTB-MPA official zoning map and the rezoning map which has been pending government approval for 15 years.	N*	An ambiguous legal framework with a lack of cross-jurisdictional coordination (i22) highlights the need for clarity and consistency in defining the jurisdictional boundaries and responsibilities of different authorities.
i26	Transparency, accountability and fairness	N*	Transparency in decision-making, handling of user fees, enforcement of Hon Mun NTZ, and paying staff salaries is limited but is needed.	Y	Transparency in managing CLC-MPA is represented by the participation of local fishers in planning, zoning, monitoring, etc. The MPA also has a well-maintained and informative website.
Participative					
i27	Rules for participation	Y*	At a local level, the MPA management regulations that identify the responsibilities of related agencies were not legalised. The participation of representative user groups, including the tourism sector, in conservation has been little mentioned in legal texts. Rules for the participation of all user groups thus need to be integrated into the legal framework governing MPAs and explained to all participants to ensure the fair sharing of responsibilities and distribution of the MPA's costs and benefits.	Y*	Rules for the participation of local communities, the border guard, and commune police were established in the planning stage. Also, the MPA management regulations approved by QN-PPC highlighted the role of local communities in deliberations and management of CLC-MPA. However, the inclusion of local people through consultation workshops, vocational training, and coral rehabilitation is still insufficient to empower local people in decision-making.
i28	Establishing collaborative platforms	Y*	Most collaborative structures (participatory management plan, Provincial Steering Committee (PSC), National Steering Committee (NSC), MPA village committees, etc.), are no longer active.	Y*	As prescribed by foreign donors, CLC-MPA's zoning and management plans are participatory. Local fishers have also participated in MPA operation. However, in a top-down regime, the involvement of local people in deliberations/decisions is limited to passive participation.
i31	Decentralising responsibilities	Y	Since 2012, the responsibilities for managing NTB-MPA have been decentralised to the city government without sufficient resources or related conditions attached to decentralisation (i21). Nor is there sufficient oversight of the city government's compliance with national aims by the national government.	Y	Some fisheries, natural resource and tourism management responsibilities were decentralised to Hoi An city government but providing inadequate technical and financial capacity and lacking conditions attached to decentralisation (i21). Also, clientelism has captured decision-making at the provincial level.

i32	Peer enforcement	Y*	Peer enforcement is ineffective due to the shortage of funding and inoperability of the radio communication system.	Y*	In the face of intensifying incoming fishing pressures, a lack of capacity for enforcement has led to the leakage of benefits, hence, undermining the participation of local fishers in peer enforcement and other collaborative platforms.
i33	Building trust and the capacity for cooperation	Y*	Due to overselling of potential MPA benefits and lacking enforcement capacity, trust amongst local fishers and dive operators has been diminished.	Y*	Ineffective enforcement has undermined trust built during the donor funding period (2003–2011). Conflicts between CLC communities and CLC-MPA Authority have increased. Moreover, incoming development forces have increased conflicts amongst community members.
i34	Building linkages between relevant authorities and user representatives	N*	Linkages amongst NTB-MPA Authority, key user groups (fishers, dive operators, etc.) and relevant authorities urgently need to be developed.	Y*	Some linkages between MPA staff, community members, tourism operators and the military were built and resulted in mixed outcomes.
i35	Building on local customs	N*	Local customs have been displaced by the relocation of fisher villages and loss of access to grounds through tourism developments.	Y*	Established collaborative structures represent certain respect for local norms and practice. The whale worship custom is often promoted by CLC-MPA Authority as a fishing cultural value to preserve. However, this is undermined by the market forces through mass tourism and incoming fishing.
i36	Potential to influence higher institutional levels	N		Y*	CLC-MPA Authority can sometimes influence city/provincial decision-making, partially due to the significant income generated from MPA user fees and the Biosphere Reserve designation. Nevertheless, this is insufficient to ensure the long-term sustainability of CLC-MPA at the current rate of tourism growth.

7.1 Economic incentives

Economic incentives are the key instruments in both MPAs. In the designation stage, funding from the state (i9), civil society organisations (including NGOs and the private sector) (i10) are the key incentives that aimed to ensure the financial sustainability of the governance framework. Local infrastructure and facilities (i8) (Table 6) were mostly funded by foreign donors [65]. Since donor-funding ended, the primary source of income for MPA operations is user fees, which is often under-reported in NTB-MPA and much of the money is alleged to be corruptly syphoned off during fee collection and management, leading to insufficient budget for MPA essential activities, especially patrolling. In CLC-MPA, although the user fees income is invested in conservation, it is still inadequate to provide for regular and effective patrolling and comprehensive biodiversity monitoring. Meanwhile, NGO funding is limited to small-grant projects that mainly focus on raising awareness, and these can undermine a strategic planning approach. Since state funding now covers only the baseline costs (staff salaries and basic infrastructure), given the weak capacity for enforcement and insufficient scientific information, it is essential to increase state funding to provide for the effective implementation of both MPAs.

In both MPAs, potential fishing and tourism benefits of MPAs have been promoted (i4) by implementing zoning regulations, green marketing (i5), and promoting diversified and supplementary livelihoods (i6). However, these benefits have been increasingly captured by incoming users and local elites due to the weak capacity for enforcement and lack of transparency and accountability. Especially, tourism development, through unsustainable practices and assigning property rights to developers (i2) with no attached conditions (i21), has led to environmental and social costs. In NTB-MPA, tourism development has led a loss of land use rights and community access to vital coastal resources. In CLC-MPA, while the closure of some reef areas to fishing might have produced some conservation benefits and funding for the MPA, the elite capture of tourism benefits (mostly through the provision of supplementary livelihoods) has led to mistrust and resentment. Moreover, overcrowding and unsustainable tourism practices have caused various pollution issues to local communities (excessive garbage, shortage of freshwater, saltwater intrusion, etc.). Thus, integrating sustainable development into MPA policies and management, transparently assigning property rights with attached conditions associated with environmental performance standards, and a fair share of benefits is urgently needed.

7.2 Interpretative incentives

The concept of MPAs was introduced in Vietnam in the 1990s when the country was one of the least developed countries, with 60% of the population living below the poverty line [66]. Poor fishers solely depended on coral reefs and reef-related resources for subsistence, and political will of the VCP leaders was mainly prioritised towards socio-economic development. Therefore, interpretative incentives were a key focus in both MPAs to communicate the MPA's conservation features (i11), potential benefits (i12) and regulations (i13) to MPA stakeholders and improve support for conservation. Public awareness was raised through a diversity of communication approaches (i11). However, the overreliance on international funding and strong tourism development forces in the context of a lack of enforcement capacity have led to ineffectiveness of most communication tools. Besides the growing mistrust for the MPAs that leads to a lack of acceptance, and thereby, compliance by local communities, tourism operators and developers have limited awareness of the need for conservation, and many tourists, especially foreigners, are unaware of the existence of the MPAs due to limited communication with operators/developers. Meanwhile, young generations within and around the MPAs would like to see more development on the islands. Thus, raising awareness should now focus on tourism operators/developers, tourists and young MPA generations using more engaging methods, provided that the effectiveness of NTZs is observable to everyone. Also, raising the awareness of the VCP's leaders should be continued, and the role of NGOs might be instrumental in this respect.

7.3 Knowledge incentives

Systematic monitoring is lacking in both MPAs. In NTB-MPA, most biodiversity surveys were conducted in the donor-funding period by collaboration between Nha Trang Institute of Oceanography, NTB-MPA Authority and local communities, though the survey results are sporadic and not used to inform decision-making, undermining the potential for adaptive management. Likewise, despite attempting to undertake reef-check surveys annually, CLC-MPA's monitoring results are rarely used to inform decision-making. Thus, it is vital to provide state funding for systematic monitoring and scientific research to promote the adaptive management of MPAs and continue collective learning initiatives (i14) that were promoted previously. Also, given the ongoing uncontrolled encroachment of land/sea, national legislation on EIA and a precautionary approach to environmental management (i15) must be implemented more seriously.

7.4 Legal incentives

Although the Fisheries Law of 2003 and the Biodiversity Law of 2008 provide hierarchical obligations for achieving MPA conservation objectives (i17), they do not clarify the specific thresholds for economic development activities. There is also a lack of clear and consistent legal definitions (i23) of roles and responsibilities of implementing authorities. Therefore, the legal framework governing MPAs in Vietnam is too ambiguous to provide for effective enforcement at the local level. Furthermore, the increasing decentralisation of natural resource management responsibilities to local governments with a lack of conditions attached (i21) has led to a lack of capacity for effective enforcement of MPA regulations. Under such circumstances, weak cross-jurisdictional coordination (i22) has exacerbated weak law enforcement (i18). MPA management now falls under MARD, but despite having recognised the need for reversing the declining trend of the nearshore fish stocks as a result of the reform of 1986, the ministry has managed the fisheries sector through various decrees, decisions, and directives [70] in a blurry division between economic development and conservation. Particularly, the objective of central government to reduce nearshore fishing capacity is conflicting with the provincial/district level objectives that aim to build the local economy. Thus, the state's vessel subsidies policies have aggravated the overcapacity issues in nearshore waters as offshore fishing vessels are often found fishing in nearshore waters and the investments themselves failed to provide for job diversification and poverty alleviation [71]. Meanwhile, due to the lack of coordination between provinces and districts, fishing boats from other districts often hold a fishing permit issued by their local authorities, which allows them to fish anywhere in the localities, including MPAs. These shortfalls have been mediated by joint enforcement between MPA authorities and the local armed forces, which depends on local government funding and the willingness of these agencies. Thus, detecting violations strongly relies on local fishers through peer enforcement (i32) that has gradually diminished due to a lack of financial support, slow responses by MPA authorities and a lack of transparency in deterring and sanctioning violators.

The decentralisation of the MPA authorities to city governments with a lack of conditions attached (i21) has exacerbated the currently weak capacity for enforcement (i18), cross-jurisdictional coordination (i22), sustained state funding (i9), and awareness-raising incentives (i11). In CLC-MPA, although joint enforcement has sometimes been effective, in the face of growing incoming users, it only offers a short-term solution, especially when legal obligations for cross-jurisdictional and trans-provincial coordination (i22) remain weak or unclear. Therefore, in the long term, a coherent legal framework that provides for cross-jurisdictional and trans-provincial co-ordination (i22) with clear and consistent legal definitions (i23) is required. Incoming fishing pressure can also be limited by implementing measures to protect local users (i3) such as issuing exclusive permits or only granting rights to fish or operating tourism in the MPA to local users (i2), of which the success also depends on a sound legal enforcement framework (i18). Nonetheless, as Vietnam still lies in the bottom half of the Corruption Perception Index (CPI) of 2016 [72] which is characterized by unaccountable government, lack of oversight, lacking space for civil society, etc., the development and implementation of such a framework significantly depends on the political will of the central government and the VCP's leaders.

7.5 Participative incentives

Stakeholder engagement has been promoted by establishing collaborative platforms (i28) in both MPAs. Local fishers are involved in biodiversity monitoring and coral reef rehabilitation programmes (i14). The engagement of local fishers has also been nurtured by voluntary peer enforcement through detecting and reporting of violations (i32). However, the force of incoming users, limited benefits gained from engagement, the disproportionate share of costs to locals, a lack of institutional support for participation, and a utilitarian view towards natural resources have resulted in limited user participation in governing both MPAs. In NTB-MPA, a lack of transparency, accountability and fairness (i26) has significantly undermined community participation in governance. Although CLC-MPA has been widely promoted as a good participatory model for MPA management in Vietnam, the intensified impacts of incoming users have shifted local resource use patterns, gradually eroded traditional customs (i35), and alongside the ineffective enforcement of the NTZs, undermined trust towards the MPA Authority (i33). Under such circumstances, the lack of management authority and enforcement capacity (i18), increasing decentralisation (i31), lack of related conditions (i21) and the lack of capacity to influence higher institutional levels (i36) by both MPAs have weakened the existing participative incentives. Under the VCP's strong grip over civil society, local communities lack basic rights to influence local decision-making and the current trend towards corporate mass tourism has seemingly exacerbated this situation. Thus, effective participative mechanisms require the recognition of legitimate rights for local resource users, appropriate sharing of MPA costs and benefits, and the empowerment of local people in local decision-making.

8. Cross-cutting issues

8.1. Leadership

Both MPAs showcase that Vietnam's legal framework governing fisheries, land resources, tourism and environmental protection still favours economic development strategies with an increasing focus on tourism. Considering the weaknesses in governing NTB-MPA, there is a severe lack of leadership/political will from all government levels. First, weak leadership from the central government is represented by increasing decentralisation to local governments with limited resources and oversight from the central government. At a provincial level, decision-making is mainly influenced by clientelism and local politics that undermine NTB-MPA's conservation objectives. In CLC-MPA, although commitments made to the UNESCO-MAB Secretariat have contributed to limiting infrastructure development on the island, all-inclusive package tours are thriving, which creates opportunities for clientelism to capture decision-making at a provincial/city level while providing low benefits to local communities. The decentralisation of CLC-MPA to Hoi An city government in 2013 was arguably to encourage this rapid development trend. Although the city government has applied some measures (a cap on the number of tourists, re-zoning CLC-MPA, the 'CLC says no to plastic bags' campaign, etc.), it is unlikely that these local-level measures would contribute to sustainable development and biodiversity conservation on a wider regional basis, since much political will is towards economic development priorities. Therefore, for both cases, the active leadership role of the central government accompanied by providing sufficient resources and oversight is needed, especially when individual MPAs are scaled up to the MPA network.

8.2. Role of NGOs

NGOs have played essential roles in governing MPAs in Vietnam by providing funding, technical expertise, facilitation and policy advocacy. However, operating in a socialist country has somewhat limited the scope of NGOs in connecting authorities with local communities. Moreover, interactions between NGOs and local communities often stop at a commune level through Civil Society Organisations (CSOs: Women's Union, Youth's Union, etc.) that are strongly influenced by the central VCP. Therefore, international NGOs tend to focus the resources on CSOs and leave the tasks of implementing MPA governance incentives to them rather than empowering wider local communities, leading to the unfair sharing of MPA costs and benefits. In both MPAs, the short-term and less integrated nature of NGO-funded projects has contributed little to achieving strategic conservation objectives. Therefore, with the available technical and financial advances and facilitation skills, NGOs could systematically contribute to conservation and sustainable livelihoods by promoting collaboration and information exchange between local communities, tourism operators, local governments and between cities/provinces. NGOs should also collaborate with city governments to advocate for the integration of environment-related contents into school programmes to stimulate behavioural change.

8.3. Equity and Stewardship

Issues associated with equity and stewardship are a major area of weakness in governing the two MPAs, especially NTB-MPA, where many fishers in the group most impacted by NTZ regulations did not receive any economic incentives through the donor-funded projects due to unfair decision-making at a commune level (as discussed in 8.2). A large portion of economic incentives (microcredit, recruitment, vocational training, etc.) went to the wrong people through patronage. Corporate tourism, which has displaced villages and caused the loss of traditional fishing grounds to many fishers, has provided no long-term jobs to local people due to their low educational background. Since 2001, the province has displaced over 260 households through tourism developments, depriving local people of their customary lands and fishing grounds.

In a socialist state, local people often have no voice over the state's orders. Many interviewed fishers reflected that local acceptance of the MPA designation was reluctantly achieved through community workshops in which they passively participated. The costs of MPA designation to the fishers were compensated mainly by providing diversified and supplementary livelihoods (i6) and green marketing (i5). However, lacking measures to prevent the leakage of benefits (i3), protection from incoming users (i20), and shortcomings in implementing alternative income programmes (i6) have led to the unequal distribution of costs and benefits. Meanwhile, pressures from incoming users have put many marginalised fishers in financial hardship. Although many local fishers still positively have a sense of stewardship for local resources (e.g. dynamite fishing is not favoured by locals), the unfair distribution of MPA costs and benefits has generated social inequity issues and corroded stewardship that fishers had formed during decades of enjoying a state of having little tourism, free access to marine resources and getting full benefits from fishing. Particularly in CLC-MPA, if fish were once caught selectively, now fishers tend to catch anything they can. Therefore, rebuilding and sustaining local stewardship and pride are essential to provide for effective MPA management. As well as ensuring the fair distribution of costs and benefits, local communities must be empowered to be involved in decision-making over their resources (i28), and their traditional values must be recognised and respected (i35). The use of community property right approaches (i2) with conditions for environmental performance standards attached with state oversight (i21) could have potential in this respect.

9. Conclusions

Emerging in a context of rapid economic growth and increasing decentralisation, the governance of NTB-MPA and CLC-MPA is characterised by a lack of control from the central government and inconsistency between national legislation and implementation at the province/district level; a lack of cross-jurisdictional coordination between relevant authorities; decision-making at the province/district level being captured by networks of patronage between political and economic elites; and a minimal level of participation from local users and communities. In NTB-MPA, economic incentives, which are the main source of government steer, are focused on donor/NGO funding to improve local perception and participation, though under an ambiguous legal framework comprising conflicting laws and regulations and too much discretion to implementing agencies. Consequently, this structure has conditioned rent-seeking behaviour. Therefore, the exhaustion of economic

incentives after donor-funding ended, coupled with insufficient state funding (due to a lack of political will), have inevitably weakened other incentives and weakened the governance framework. The governance of CLC-MPA is more effective than NTB-MPA due to the better use of combinations of incentives with better political support. The key strengths in CLC-MPA's governance include efforts made in on-going education and awareness-raising campaigns, and engagement of local fishers in enforcement, collective learning, and biodiversity surveys. However, such mechanisms have still highly depended on economic incentives, especially funding from international actors and tourism through user fees. Meanwhile, despite having stronger political support, CLC-MPA is still enmeshed in a context of rapid socio-economic development, with tourism being a key sector under a weak regulatory framework with a lack of top-down control and interventions.

Accordingly, both MPAs have been subject to the capture of decision-making and benefits by clientelism, and the erosion of local stewardship and social capital. Thus, the two MPAs have arguably become a vehicle to promote mass tourism development strategy rather than to contribute to achieving the CBD MPA targets. Addressing the impacts of mass tourism is, therefore, an urgent need to maintain the health of ecosystems and ensure social equity. In the light of these findings, options to improve the governance of the two MPAs include (a) increasing the role of central government in decentralisation through strengthening legal incentives, particularly attaching conditions to decentralisation, and stimulating political will, (b) empowering local communities in governing their local resources, (c) using property right approaches with legal conditions attached that are enforced, (d) supporting community-based development, and (e) engaging tourism operators/developers in promoting sustainable resource use, green marketing, and awareness-raising to ensure activities are conducted within the MPAs' social and ecological carrying capacity, leading to a fairer distribution of costs and benefits. Given Vietnam's remarkable achievements in socio-economic development over the past few decades, there are clear chances to attain such solutions if the central government has sufficient political will to proceed, the alternative being that both MPAs proceed down the path towards unsustainable development through increasing impacts of mass-tourism and overfishing.

Acknowledgements

The authors would like to thank IUCN Vietnam for providing an internship that has contributed enormously to the data collection for this research. The authors are also grateful to Nha Trang Bay MPA Management Authority, marine scientists from the Institute of Oceanography Nha Trang and Cu Lao Cham MPA Management Authority who strongly supported our field trips in Nha Trang Bay and Nha Trang city during July–December 2015 and in Cu Lao Cham and Hoi An city during August–September 2015. This research was supported by UCL Institute for Sustainable Resources and BHP Billiton Scholarship.

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Supplementary Material Detailed incentives tables for NTB-MPA and CLC-MPA

NTB-MPA - Incentives applied (Y) including those that are particularly important priorities for strengthening (Y*) and introducing (N*).

Incentive	Used	How/Why
Economic		
i2. Assigning property rights	Y*	Property rights (both land and sea) were assigned to tourism developers with no attached conditions. Besides, tourism operators from the mainland Nha Trang do not operate sustainably. Therefore, environmental standards should be attached to any property and user rights.
i3. Reducing the leakage of benefits	N*	Tourism development has caused the loss of land and resource access to local fishers while having provided no benefit to them. Besides, the NTZs which restrict local fishers, have become available for cyanide fishing by outsiders due to insufficient enforcement capacity and bribery.
i4. Promoting profitable and sustainable fishing and tourism	Y*	NTB-MPA is a multiple-use MPA. NTZs occupy about 10% of the MPA area and allow sustainable tourism activities and ban all kinds of extraction. Other zones allow compatible uses and prohibit habitat-destructive activities (the disposal of waste and sewage, bottom trawling, etc.), though these activities happen daily. Overall, the ineffectiveness of NTZs has undermined this incentive.
i5. Promoting green marketing	Y*	Hon Mun Island has been promoted as the 'coral island' or 'one of the best diving sites in Vietnam', though the degraded reefs and overfishing undermine this marketing. The HM-MPA project encouraged 15 local fishers of Hon Mot Island to convert their fishing coracles into glass-bottom coracles and provided financial aid to cover the costs of conversion. This initiative was also promoted as community-based tourism. But the relocation of Hon Mot village and a lack of measures to reduce the leakage of benefits have rendered this initiative ineffective.
i6. Promoting diversified and supplementary livelihoods	Y*	Numerous activities were attempted during 2001–2011 (capacity building for local fishers, sustainable aquaculture, ecotourism, handicrafts, etc.). Also, a micro-credit scheme was established to support these models, though there were patronage, clientelism and rent-seeking issues related to its distribution. Six MPA wardens were employed from local communities, though their salaries were low, less than subsistence fishers. These short-term incentives are insufficient to compensate for the loss of fishing grounds and livelihoods.
i8. Investing MPA income/funding in facilities for local communities	Y*	The HM-MPA project created the 'Environmental Development Fund' with an opening balance of US\$34,000 to provide for upgrading roads, medical stations, public toilets, and public markets for local communities. The province committed to reallocating 10%-15% of MPA income from user fees to sustain such fund. But this policy was soon rejected because due to the incompatibility with the institutional context of Vietnam. Then, the SLMPA project (2006-2011) further contributed to upgrading a village temple, building private toilets, installing water filtration tanks for 60 households. But this funding was undermined by unfair decision-making at a commune level. Meanwhile, tourism development has not yet invested in local facilities.
i9. Provision of state funding	Y*	During 2001-2011, donor funding for NTB-MPA establishment and management was channelled through the central government. Since 2011, the MPA funding has mostly come from tourism income from MPA user fee.
i10. Provision of NGO, private sector and user fee funding	Y*	MPA operation is sustained by MPA user fees (~US\$150,000 per year, US\$1 per visit, and US\$3 per diving and snorkelling). NGO funding is sporadic and less integrated into strategic conservation objectives.
Interpretative		
i11. Raising awareness	Y*	Use of radio broadcasts, education programmes, performance shows, video and documentary films, and a visitor centre on Hon Mun Island; provision of study tours to Southeast Asia for state officials and local users, though most of these are ineffective.
i12. Promoting recognition of benefits	Y*	Focus on raising the awareness of the potential benefits of not fishing in NTZs through spill-over/export effects and operating ecotourism. But it seems like the benefits were oversold by a promise to compensate local fishers for the loss of resource access, leading to fishers' distrust when the MPA is not effectively managed and therefore does not deliver such benefits.
i13. Promoting recognition of regulations and restrictions	Y*	Leaflets, website, and signboards were used to promote the recognition of NTB-MPA zoning regulations. All of these are not in use now. The website closed, and the leaflets are undistributed. There also exist confusions between NTB-MPA official zoning map and the rezoning map, which was disapproved by KH-PPC exists [67, 68, 69].
Knowledge		

i14. Promoting collective learning	Y*	During 2001-2005, participatory planning was undertaken through community meetings and consultation workshop. Coral reefs and biodiversity monitoring were occasionally conducted by scientists and community members. Also, participatory rural appraisal method was used in the socio-economic assessment to identify local concerns and aspirations and incorporate them into the re-zoning plan which was rejected after the donor funding ended. Now, biodiversity surveys have been occasional and dependent on external funding sources. Community members have no longer participated in monitoring due to a lack of trust for NTB-MPA Authority.
Legal		
i17. Hierarchical obligations	Y*	The MPA was gazetted to help Vietnam fulfil its commitment to the CBD MPA target. At designation, Vietnam only had a single piece of legislation associated with marine resource management which listed several prohibited activities (e.g. dynamite and cyanide fishing). Since 2003, many legislations have come into force with stipulations relevant to the governance of NTB-MPA (e.g. the Fisheries Law, the Law on Cultural Heritage; the Biodiversity Law, etc.). But as law breaching happens daily in Vietnam, none of these Laws seems to be enforceable in NTB-MPA especially when the provincial leadership appears to have no political will for conservation.
i18. Capacity for enforcement	Y*	The HM-MPA project provided NTB-MPA with two patrolling boats and a radio communication system to connect between MPA wardens and MPA villages to promote peer enforcement by local communities. But the MPA is now too short of funding to run the boats. And the communication system has been inoperable. Under an ambiguous legal framework, when the MPA Authority has no administrative functions, enforcement is a joint task between MPA wardens, Fisheries Inspectors, and the Border Guards. But this joint enforcement rarely happens, leading to daily acts of illegal fishing throughout the MPA.
i19. Penalties for deterrence	Y*	Large fines can be imposed for breaching national laws associated with fisheries, environmental protection, and biodiversity conservation. But due to the lack of enforcement capacity and poor coordination with other agencies, filing and treating violations is time-consuming. Therefore, MPA wardens tend to confiscate the catch of poor local fishers while ignoring the violations by outsiders who are ready to bribe them. As such, fines are rarely applied and can be quashed through connections.
i20. Protection from incoming users	N*	Given the lack of enforcement capacity, coordination and transparency in enforcement, incoming fishers can enter the MPA easily and illegally fish. Also, the tourism benefits of conservation have been captured by the network of patronage between the city/provincial government officials and corporations.
i21. Attaching conditions to use and property rights, decentralisation, etc.	N*	All user and property rights issued, particularly to tourism developers/operators, need to be attached with some performance standards and conditions related to the MPA conservation objectives, including social equity issues. Also, given the recent overdevelopment of tourism infrastructure, there is a need to attach environmental standards to decentralisation arrangements. Overall, decentralisation to provincial and municipal levels also needs to have conditions attached, with national state oversight.
i22. Cross-jurisdictional coordination	Y*	Coordination was promoted through collaborative structures (PSC, NSC, etc.) while Vietnam was still adopting a sectoral approach to natural resource governance. Besides, as this incentive was influenced by donor funding, it failed after donor funding phased out. Since NTB-MPA came under NT-CPC, despite a coordinating mechanism existed amongst NTB-MPA Authority and local authorities, there has been limited funding and political will supporting it. A lack of cross-jurisdictional coordination is one of the main weakness undermining joint enforcement.
i23. Clear and consistent legal definitions	N*	The legal framework governing NTB-MPA comprises fragmented, unconnected, and conflicting legislation. Consequently, there are often power conflicts, overlaps and gaps in jurisdiction among agencies in charge. A strategy for implementing Integrated Coastal Management (ICM) is underway to improve it. However, whether it will contribute to integrated ecosystem-based management depends critically on an effective network of MPAs. There are also confusions between NTB-MPA official zoning map and the rezoning map which was disapproved by KH-PPC.
i26. Transparency, accountability and fairness	N*	There is a serious lack of transparency in many aspects, including decision-making influenced by clientelism, the collection and handling of user fees, enforcement of Hon Mun NTZ, paying staff salaries, etc.
Participative		
i27. Rules for participation	Y*	Although every national legislation (Fisheries Law, Biodiversity Law, etc.) stipulates the participation of relevant agencies in protecting the marine biodiversity and resources, implementation is very weak. At a local level, the MPA management regulations which identify the responsibilities of each local agency were not legalised. The participation of representative user groups, including the tourism sector, in conservation, has been little mentioned in legal texts. Therefore, rules for the participation of all user groups need to be

		integrated into the legal framework governing MPAs and explained to all participants to ensure the fair share of responsibilities and distribution of MPA costs and benefits.
i28. Establishing collaborative platforms	Y*	Most collaborative structures (a participatory management plan, Provincial Steering Committee (PSC), National Steering Committee (NSC), MPA village committees, provision of training on conducting Reef-check surveys to twelve local fishers, joint enforcement, the engagement of dive operators in removing COTs and garbage collection once a year), are no longer active.
i31. Decentralising responsibilities	Y	Since 2012, the responsibilities for managing natural resources and the MPA have been decentralised to Nha Trang city government without sufficient human, technical and financial resources, or related conditions attached to decentralisation. Nor is there sufficient oversight of the city government's compliance with national aims by the national government.
i32. Peer enforcement	Y*	Without sufficient resources, in the beginning, the MPA relied on local villagers for detecting violations. But since the radio communication system on which peer enforcement relies became inoperable, this incentive is no longer in use.
i33. Building trust and the capacity for cooperation	Y*	At the designation stage, to gain trust from local communities, six MPA wardens were hired from local communities to oversee 24/7 patrolling in NTB-MPA. But as these wardens reflected the lack of transparency in paying salaries and incentives, most of them left after the initial donor-funded project ended. Furthermore, due to the overselling of potential MPA benefits, lack of enforcement capacity, the trust from local fishers and dive operators has now been diminished.
i34. Building linkages between relevant authorities and user representatives	N*	Linkages between NTB-MPA Authority and key user groups (fishers, dive operators, etc.), and with relevant authorities urgently need to be developed.
i35. Building on local customs	N*	Local customs have been displaced by the relocation of fisher villages and loss of access to grounds through tourism developments.

CLC-MPA - Incentives applied (Y) including those that are particularly important priorities for strengthening (Y*) and introducing (N*).

Incentive	Used	How/Why
Economic		
i2. Assigning property rights	Y*	A sea area of 19km ² was assigned to a group of 12 fishers in Bai Huong village to engage them in MPA management and promote the sustainable exploitation of local resources and local stewardship. In 2013, QN-PPC institutionalised this as the ' <i>Bai Huong Sub-MPA</i> ' as a sub-unit under CLC-MPA Authority and provided the group with a wooden boat for enforcement, fuel cost, and reinvested 2% of CLC-MPA's tourism revenue in supporting Bai Huong Sub-MPA's daily management activities. A right to use 0.25km ² of land area and the surrounding sea surface was granted to a corporation to develop an ' <i>eco-resort</i> '. However, with no environmental performance standards attached, these property rights often lead to impacting developments. Also, a lack of legal protection from incoming users has further undermined this incentive suggesting for redesigning property right approaches considering the use of attaching conditions to use and property rights and legal protection from incoming users to support it.
i3. Reducing the leakage of benefits	Y*	Six local fishers were employed as MPA wardens indicating a minimal amount of employment in MPA management. Besides, there is also a minimal amount of direct employment in tourism, while indirect employment is limited to a few community members. Given that many of these members might not represent the groups most affected by MPA designation, this incentive is insufficient to promote the fair distribution of benefits amongst local people. Furthermore, as incoming fishing pressure is growing in CLC, fishing permits assigned to incoming fishers should respect CLC regulations to ensure that CLC fishers can also capture the benefits of conservation.
i4. Promoting profitable and sustainable fishing and tourism	Y*	The zoning of CLC-MPA adopted an Integrated Coastal Management (ICM) approach. However, since no-take zones (NTZs) are small (covering only 0.54% of the MPA total area) and dispersed, enforcement is difficult and costly. About 90% of CLC-MPA area allows sustainable fishing activities, and the remaining 9% is for tourism, community development, ecological restoration and protected forests. A re-zoning plan is underway to scale up the NTZ area and better promote potential spill-over/export benefits.
i5. Promoting green marketing	Y*	As MPA restrictions have diverted many fishers to land crab exploitation leading to overexploitation, land crabs are eco-labelled as a ' <i>green product of CLC</i> ' to promote sustainable exploitation and sustainable livelihoods for local communities, despite the declining resource populations. With NGO funding, markets have been developed for CLC's land crabs to promote demand and price premium. Meanwhile, CLC-MPA has been promoted as an eco-tourism destination with a slogan ' <i>Tourism in the Cham Islands—the Fresh and Mysterious allure of nature</i> '. Many tourism operators brand themselves as being ' <i>eco</i> ' without being certified. Also, since the biosphere reserve designation, the UNESCO biosphere reserve title has been used as a marketing strategy to promote ecotourism in both Hoi An city and CLC-MPA despite no conservation measure attached to such a strategy. This needs to be strengthened by linking with promoting sustainable tourism by promoting CLC's unique natural, cultural and historical values.
i6. Promoting diversified and supplementary livelihoods	Y*	Donor funding supported the implementation of additional livelihoods for about 184 households that were listed as being affected by the MPA designation. These livelihoods are mostly tourism and services associated (restaurants, motorcycle taxi, homestay, tourist boat operation, glass-bottom coracles, etc.) [41]. Vocational and English training courses were also provided. Six local fishers were also employed as MPA wardens. Nonetheless, these livelihoods have served to contribute to the current trend of mass tourism development. Therefore, this needs to be strengthened by combining with promoting profitable and sustainable fishing and tourism incentive.
i8. Investing MPA income/funding in facilities for local communities	Y*	Donor funding was partially allocated to local facilities and infrastructure (the construction of garbage collection and treatment system, biogas system, local clinics, providing public toilets, upgrading household toilets, etc.). The income from tourism is not re-invested in local facilities, especially sewage and waste treatment centre.
i9. Provision of state funding	Y*	During 2003–2006, the establishment of CLC including planning, design, zoning, and developing a management plan was funded by development aid from DANIDA through the ' <i>Support to the Marine Protected Area network in Vietnam</i> ' project. During 2006–2011, DANIDA continued its support to CLC communities through the ' <i>Sustainable Livelihoods in and around Marine Protected Areas</i> ' (SLMPA) project. Both projects were co-financed by the Vietnamese Government. Since foreign aid ended in 2011, some state funding has been allocated to basic infrastructures and staff salaries but is insufficient to take over from development aid funding and provide long-term strategic funding. Other sources of state funding are channelled through the Vietnam UNESCO-MAB committee.
i10. Provision of NGO, private sector and user fee funding	Y*	Although income from user fees had increased critically from US\$90,000 to US\$520,000 during 2007–2015, it is not enough to cover the costs of comprehensive biodiversity surveys and regular patrolling (only US\$4,500 is allocated to MPA enforcement yearly). NGO funding is limited to small-grant projects (eco-labelling of land crabs, training fishers in reef check surveys,

		etc.). These do not provide long-term strategic funding. To date, there has been no funding from private tourism operators/developers.
Interpretative		
i11. Raising awareness	Y*	Public awareness is raised using community meetings, consultation workshops, brochures, pamphlets, posters, a visitor centre, website, radio and TV broadcasting, etc. The marker buoy system was installed to increase fishers' awareness of NTZs. Overseas and domestic study tours were provided to state officials and some community members. Also, to support the eco-labelling of land crabs, signboards with a slogan – <i>'land-crabs without an eco-label are illegal'</i> were erected in all stalls and restaurants. However, the awareness of tourists of CLC conservation features and regulations remains very limited.
i12. Promoting recognition of benefits	Y	Perception of local fishers regarding potential benefits (through spill-over/exports, tourism, etc.) of the MPA has been promoted through awareness-raising and capacity building programmes (scuba diving training, coral rehabilitation training, etc.). However, these benefits are undermined by ineffective enforcement and growing impacts of incoming users.
i13. Promoting recognition of regulations and restrictions	Y*	Leaflets, website, and signboards (often obscurely positioned) are used to promote the public recognition of CLC-MPA regulations and restrictions. CLC-MPA Authority also attempted to outreach CLC's neighbouring communities through the community-based garbage management and the coral reefs conservation projects. However, due to the recent decentralisation, these activities have been challenged by the reduction in the institutional capacity of CLC-MPA Authority and a shortage of funding. This needs to be strengthened with a focus on tourists, tourism operators, and incoming fishers.
Knowledge		
i14. Promoting collective learning	Y*	The small and patchy NTZs of CLC-MPA paradoxically reflect that the opinions of local fishers were considered and respected during the planning process. Fishers have also actively participated in biodiversity with scientists and CLC-MPA Authority. Nonetheless, comprehensive biodiversity monitoring has significantly relied on donor and NGO funding. Currently, simple surveys using the reef-check protocol are conducted by CLC-MPA Authority with crucial knowledge inputs from local divers. A log-book programme is used to encourage the voluntary participation of fishers in tracing their catch. At present, 40 households (out of 560 fishing households) have participated in this programme.
i15. Agreeing approaches for addressing uncertainties	Y*	A 120km ² buffer zone represents a precautionary approach to ensure sustainable fishing practices surrounding the MPA. However, implementing such precautionary measures remains challenging, especially when the funding and enforcement capacity is insufficient to provide for effective enforcement of the NTZ regulations.
Legal		
i17. Hierarchical obligations	Y*	Neither the Biosphere Reserve nor nearby WHS designations carry any obligations for CLC-MPA. The increasing decentralisation has allowed many ways of interpreting national laws at the local government levels leading to MPA objectives being undermined by local socioeconomic development and political priorities.
i18. Capacity for enforcement	Y*	Under an ambiguous legal framework, the increasing decentralisation has led to a lack of capacity for effective enforcement of MPA regulations. Currently, these shortfalls have been mediated by joint enforcement between CLC-MPA Authority, the border guard, and the commune police, which is irregularly undertaken (~13–15 times per month on two patrolling boats provided by donors). Given the incoming fishing pressure driven by the nationwide depletion of coastal resources, such local approaches are insufficient to provide for protection against incoming users. Therefore, this needs to be strengthened by adequate top-down supported enforcement by the central state.
i19. Penalties for deterrence	Y*	Compared to other MPAs in Vietnam, the competence of CLC-MPA in enforcing national laws is better through the joint enforcement protocol. However, due to insufficient enforcement capacity, the number of deterred cases is minor to the number of infringements. Therefore, penalties are not enough to deter others and promote the compliance of incoming fishers and the voluntary participation of local fishers. This incentive is also undermined by the tight control of the Communist Party over its judicial system. In reality, levels of sanction imposed on infringements to fisheries measures have been criticised as being much higher than those associated with damaging marine habitats and dumping of waste and toxins into the sea waters caused by tourism infrastructure development and industrialisation, leading to social justice and inequity issues. Thus, there needs to be increased political will to impose more effective and equitable deterrents for all infringements.
i20. Protection from incoming users	N*	Provided that the number of violations by incoming fishers in 2015 was four times that of local fishers, and corporate interests have captured tourism benefits, this incentive needs to be introduced.
i21. Attaching conditions to use and property rights, decentralisation, etc.	N*	<i>'Bai Huong sub-MPA'</i> needs to adhere to certain legal obligations to achieve the MPA objectives given that board members often allegedly violated the NTZ regulations. The participation in CLC's log-book programme could be one of these conditions to ensure the consistency of such

		rights with CLC's conservation objectives. Besides, environmental performance standards must adhere to permits issued to tourism operators and use rights assigned to corporations. Also, the lack of legal conditions by central-level authorities attached to decentralisation has led to the recent infrastructure projects that harm CLC's habitats and ecosystems. Therefore, decentralisation to provincial and municipal levels also needs to have conditions attached, with national state oversight.
i22. Cross-jurisdictional coordination	Y*	Recognising the lack of coordination among agencies, CLC-MPA Authority has established a good coordinating relationship with the border guard and the commune police building on the remoteness of CLC-MPA that tends to create intimacy between people. The MPA Authority also gives a part of tourism income for the coordination in joint enforcement and information exchange. However, given the impacts of incoming users, the coordination between related city/provincial authorities and between provinces is required to mutually agree on the obligations to comply with CLC-MPA regulations adhered to permits issued to incoming fishers and tourism operators to promote sustainable resource use.
i23. Clear and consistent legal definitions	N*	An ambiguous legal framework with a lack of ' <i>cross-jurisdictional coordination</i> ' highlights the need for clarity and consistency in defining jurisdictional boundaries and responsibilities of different authorities. Besides, the incomplete decentralisation has resulted in inconsistency and conflicts between the central-level strategic objectives and local objectives. Without thresholds defined for economic development activities in CLC-MPA, local governments often opt for economic development priorities, leading to CLC's current state of massive and uncontrolled development. Also, a lack of coordination between cities/provinces is undermining efforts that CLC-MPA has made in establishing the joint enforcement protocol.
i26. Transparency, accountability and fairness	Y	Transparency in the management of CLC-MPA is represented by the participation of local fishers in planning, zoning, monitoring, etc. The MPA also has a well-maintained website which makes a lot of management information available to the public.
Participative		
i27. Rules for participation	Y*	Rules for the participation of local communities, the border guard, and the commune police were established in the planning stage. Also, the MPA management regulations approved by QN-PPC highlighted the role of local communities in deliberations and management of CLC-MPA. However, the inclusion of local people through consultation workshops, vocational training, and coral rehabilitation is still insufficient to empower local people in decision-making, given the highly top-down nature of Vietnam's political system. This again requires more intervention from the central state in requiring the empowerment of local people. Simultaneously, while the tourism sector is currently the main beneficiary of conservation, the need for engaging tourism operators/developers in MPA governance has only been recognised lately. Therefore, rules for the participation of all user groups need to be integrated into the legal framework governing MPAs and explained to all participants to ensure the fair share of responsibilities and distribution of MPA costs and benefits.
i28. Establishing collaborative platforms	Y*	Various collaborative platforms, including the participatory zoning and management plan, were formed with NGO and international donor support. Local fishers have also participated in peer enforcement, biodiversity monitoring, and coral reef rehabilitation programme. Nonetheless, in a highly top-down system, the involvement of local people in deliberations/decisions is limited to passive participation which is often stimulated using coercive means and economic incentives.
i31. Decentralising responsibilities	Y	Some fisheries, natural resource and tourism management responsibilities were decentralised to Hoi An city government to mobilise local resources for effective management while providing inadequate technical and financial capacity to ensure the fulfilment of MPA conservation objectives. Besides, owing to the increasing penetration of market forces, clientelism has captured decision-making at the provincial level. Therefore, decentralisation does not itself need to be strengthened but it is vital to attach legal conditions and retain some degree of state control to steer decentralisation towards achieving strategic conservation objectives.
i32. Peer enforcement	Y*	Without sufficient financial and human resources, enforcement depends on local fishers for detecting violations. However, in the face of intensifying incoming fishing pressure, a lack of capacity for enforcement has led to the leakage of benefits, hence, undermining the participation of local fishers in peer enforcement as well as other collaborative platforms.
i33. Building trust and the capacity for cooperation	Y*	Trust was built during the donor funding period (2003–2011) through the establishment and facilitation of collaborative platforms. But as funding phased out, state funding is insufficient to provide for regular patrolling, therefore undermining effective enforcement and peer enforcement. Conflicts between CLC communities and CLC-MPA Authority have been raised. Moreover, the incoming development forces have increased conflicts amongst community members. As such, social capital and networks for cooperation have gradually been eroded.
i34. Building linkages between relevant	Y*	CLC-MPA Authority locates its patrolling and community development unit on the island to better monitor fishing and tourism activities and stay in touch with local communities. As such, some linkages between MPA staff, community members, tourism operators and the Military were built and resulted in mixed outcomes. For example, links between CLC staff and some

authorities and user representatives		homestay owners, and between CLC staff with tourism operators have somewhat contributed to the unfair distribution of MPA costs and benefits. In contrast, links between MPA staff and some hookah divers have constantly encouraged the participation of divers in coral reef surveys and rehabilitation programmes. These fishers have subsequently had some influence on changing behaviours of other fishers. Overall, strengths and weaknesses of this incentive imply for a need to develop more strategic linkages between representatives from the user and regulatory communities to improve the resilience of governance framework.
i35. Building on local customs	Y*	Collaborative structures discussed above represent certain respect for local norms and practice. Besides, the Whale worship custom has often been promoted by CLC-MPA Authority as a fishing cultural value to preserve. Furthermore, honesty, compassion, and like-mindedness of CLC people have been fundamental to sustaining the governance of CLC-MPA until today. However, this is being undermined by the market forces through mass tourism and incoming fishing.
i36. Potential to influence higher institutional levels	Y*	CLC-MPA Authority can influence city/provincial decision-making in some instances (e.g. downscaling a resort construction project, putting a cap on tourist numbers). This is partially due to the significant income generated from MPA user fees and the Biosphere Reserve designation. Nevertheless, this incentive is insufficient to ensure the long-term sustainability of CLC-MPA at the current rate of tourism growth because a revenue-generating agency is only mandated to making recommendations on the provincial/district master plan rather than to be involved in making decisions over individual development projects which are often favoured by local state authorities.