MARINE PROTECTED AREAS

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CONTEMPORARY MANAGEMENT APPROACHES AND SOCIO-ECONOMIC CHALLENGES

A literature overview
with a focus on the Coral Triangle region

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Preface

This overview of recent publications concerning the governance of Marine Protected Areas (MPAs) with a special focus on the Coral Triangle region is based on my involvement with two WWF projects in Malaysia and Indonesia. As a donor with no background in marine issues, I wanted to learn more about MPAs and their management. Thus, I asked Daniela Abegg, who had just finished her Master of Science in Ecology at the University of Zurich, to research the subject.

As the paper progressed, we thought that this overview – far from being complete – might be helpful to others working on and around MPAs. Daniela Abegg offers a condensed report with her state-of-the art compilation of published papers on general governance approaches for MPAs and case studies from the Coral Triangle region. She includes in her findings an extensive reference list and a practical guide to current programmes, tools and organisations working on this issue.

We hope that this overview of MPAs will be shared informally among NGOs, government agencies, academics, foundations and the economic and tourism sector – people whose day-to-day engagement might not always allow them to follow ongoing discussions. It is a small contribution to an important conservation tool, as MPAs not only preserve marine biodiversity but also safeguard marine food sources for millions of people whose livelihoods depend on the sea.

Irene Reynolds Schier, Zurich, July 2014

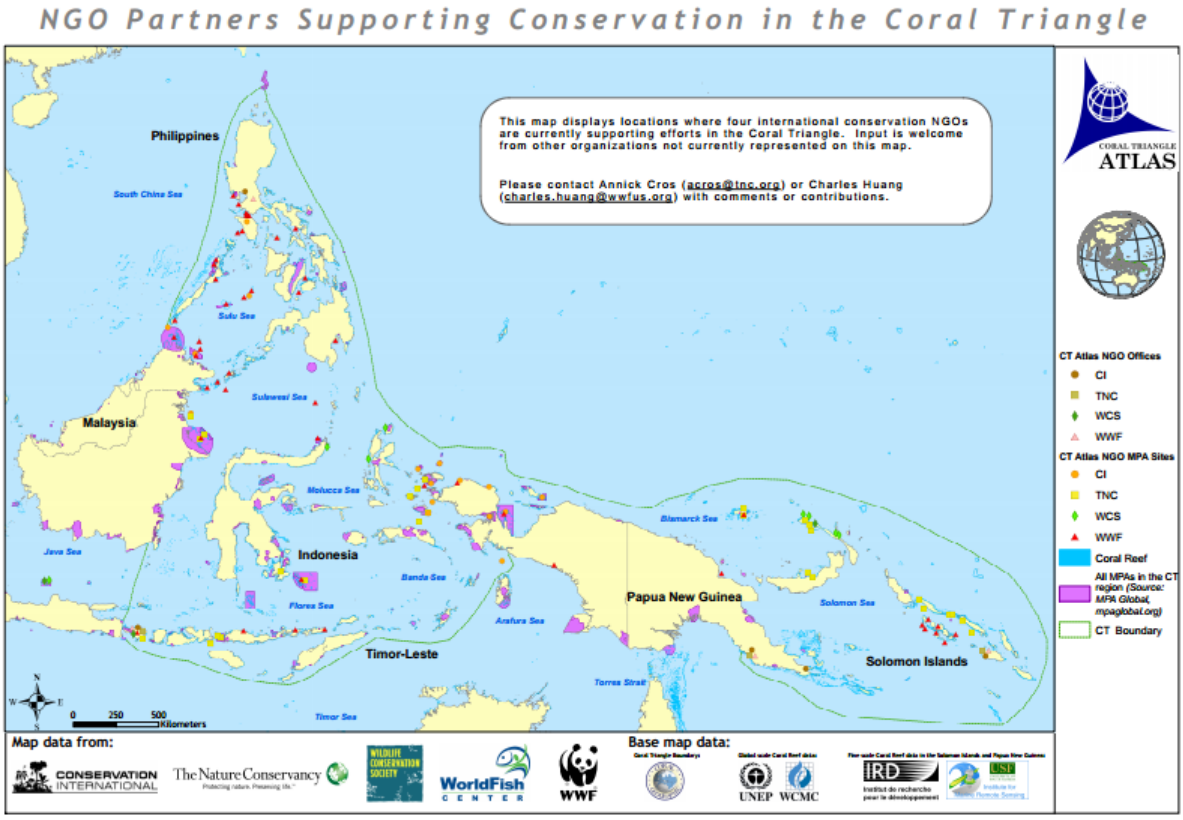
1. Introduction

Marine protected areas (MPAs) may be created for different purposes, including the protection of species and unique habitats and the enhancement of local fisheries. Under these circumstances, MPAs are an immediate and practical solution as they may provide an umbrella effect for the protection of overall biodiversity (see, for instance, Majors 2008). As of 2010, the world hosted more than 5,880 MPAs, encompassing 1.17% of the world's oceans (Mora & Sale 2011). The revised Strategic Plan for Biodiversity, including the CBD Aichi Biodiversity Targets, has a target of 10% of the world's oceans to be designated and protected as MPAs by 2020 (UNEP/CBD/COP 2012). Today's global coverage by MPAs is still limited and these MPAs have so far mostly operated at a loss (Mora 2011).

Although a considerable body of research has described customary MPA management systems, there are still significant practical and theoretical obstacles to the incorporation of management methods into contemporary marine resource conservation (Cinner & Aswani 2007). This literature review intends to provide the reader with an overview of modern MPA governance strategies that have proven both effective in achieving their conservationist objectives and equitable in addressing related social justice issues. In the first part, this work describes the findings of Jones (2014) who, first, has developed a promising up-to-date governance analysis framework and, second, provides an extensive resource for MPA managers on how different incentives might be combined to support the governance of their respective MPA. The vast diversity of case studies found in research literature and the different approaches and incentives – some successfully implemented, other failed – make it almost impossible to give an overall conclusion. As it appears that the expansion of a strategy aimed at protecting global marine biodiversity is unrealistic, it becomes even more important that governance strategies are implemented effectively at a local scale. What seems to be crucial in this context is the explicit evaluation and consideration of stakeholder preferences, especially of those most involved in making decisions and accessing resources − a recurring theme throughout this work. Based on a sound and asserted legal framework with clear and consistent objectives, a combination of appropriate incentives depending on stakeholder needs, with the promotion of mutual respect and collective learning, including exchanges between different knowledge owners, may be the key to successful MPA governance (McClanahan 2012, Jones 2014).

The number and coverage of MPAs is disproportionately high in more economically developed countries (Marinesque et al. 2012), and while most western countries have adopted fisheries and coastal management strategies that largely suit their requirements, many developing countries still lag behind in terms of efficient fisheries management and marine conservation. The importance of marine resources in these regions cannot be overemphasised as they provide valuable goods and services to society. For instance, seafood provides an important source of protein for millions of people in south-east Asia. For this reason, the second part of this review will elaborate on the socio-economic aspects of MPA governance in a critical global priority area for marine conservation: the Coral Triangle region. Selected case studies highlight how local fishing communities have responded to and been affected by implementation of MPAs. Good and bad examples are easily detected and it becomes apparent that local communities play a principal role in the success or failure of MPA governance. What seems to be crucial in this respect are economic incentives that ensure local fishing communities do not have to bear a disproportionate burden of the costs of MPA enforcement compared with benefits accruing to others. Additionally, in terms of law enforcement it is critical that preventive measures are applied during early planning stages – these have proven

much more effective as a deterrent to illegal fishers than the mere deployment of 'power people' tactics (Gustave & Borchers 2008, Dygico et al. 2013).



Source: The Coral Triangle Atlas map gallery (ctatlas.reefbase.org)

2. Governing Marine Protected Areas

If not stated otherwise, this chapter summarises findings of Jones (2014) on the governance of MPAs. The arguments and frameworks in his book 'Governing Marine Protected Areas − Resilience through diversity' should help inform discussions on how MPAs can be governed in a way that makes them both effective in achieving their conservationist objectives and equitable in addressing related social justice issues. The main objectives of the designation and governance of MPAs are the restoration of marine ecosystems and fish stocks, the contribution to an MPA network and the marine spatial planning, the protection of rare and vulnerable habitats and species, the promotion of research and education, the control of the impact of tourism and recreation, and the maintenance of traditional uses while recognising the cultural symbolic value of set-aside areas. Another key theme is that of governance: MPA governance needs to combine people, state and market approaches rather than focusing on a single approach and its ideals. By means of a novel MPA governance analysis framework, including 20 case study MPAs, the reader is provided with an in-depth 'menu' of 36 incentives that should be considered for an effective governance approach.

2.1 Different theoretical perspectives

There is a growing recognition in governance debates of the need to move beyond ideological arguments as to which approach is 'right' or 'best' and, instead, develop governance models, frameworks and approaches that combine the role of the state (governments and regulatory agencies), the market (economic systems) and people (civil society, their networks and related organisations). The **co-evolutionary hierarchical governance concept** described by Jones (2014) recognises that top-down, bottom-up and market approaches are interlinked, e.g. through the influence of local people on higher level institutions. Effective governance approaches have the potential to enable the co-evolution of both social and ecological systems by promoting resilience through an increase in the diversity of institutions involved. Some case studies demonstrate that the state plays a critical role in managing resilience. The co-evolutionary hierarchical governance concept is more consistent with arguments that although the state should play a key role in governance, rather than through direct command and control, it should rely primarily on indirect control by various means, such as attaching conditions to property rights, setting standards with which organisations with decentralised authority must comply, etc., and ultimately retaining the right to withdraw such rights and authorities.

The IUCN recommends **co-management** in its MPAs guidelines, a concept that builds on the foundation that all local users (stakeholders) should participate in decisions in a manner that allows them to significantly influence these decisions. Co-management is an applied expression of the challenges of combining top-down and bottom-up approaches, as it is based on partnerships between local users and state agencies. A balance is achieved between empowering stakeholders, in order to ensure that their rights, priorities and objectives are provided for, and allowing the state to retain enough power to ensure achievement of the conservation objectives of a protected area. Therefore, the balance can be considered as mainly an avoidance of the risks of imposition (protected areas could actually contribute to the problem of over-exploitation, in that they disempower local people and their traditional means of sustainable exploitation of nature) on one hand, and the risks of parochialism on the other ('tyranny of localism', where local elites capture governance processes, marginalising less advantaged people from access to decision-making processes. In less economically developed countries (LEDCs) in particular, much stronger top-down

controls through international bodies may be required to ensure the fulfilment of strategic conservation objectives and obligations.

Co-management is often combined with the concept of adaptive management, practised as a 'learning by doing/mistakes' approach. Although this concept of **adaptive co-management** (ACM) appeals as a simple step-by-step cyclical process (see Fig. 1), Jones (2014) criticises its simplicity, which distracts from the often more complicated reality of governmental challenges that should be addressed through the co-evolutionary hierarchical governance concept.

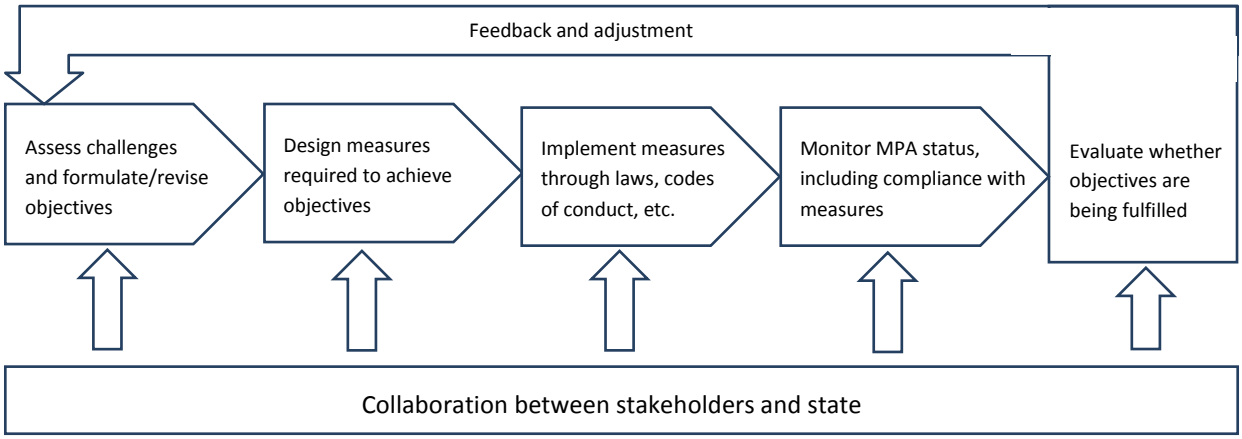


Figure 1. Adaptive co-management process for MPAs, according to Jones (2014).

Market approaches often emerge as key elements in most perspectives on co-management. Connecting local people to external markets is seen as a means of increasing the probability that community-based conservation will be successful, e.g. by assigning property rights or by increasing local economic benefits from sustainable and compatible natural resource exploitation activities (Seixas & Davy 2008). From a more top-down perspective, there is a growing focus on the ecosystem services that seas provide, coupled with concerns that these services are being undermined by the degradation of marine ecosystems. Accordingly, it has been argued that there is an urgent need to 'catalyse ocean finance' to transform the management of marine resources, using instruments such as 'blue carbon' payments (promotion of the use of certain marine habitats as carbon sinks), and other initiatives related to payments for ecosystem services (PESs). Additionally, the Convention on Biological Diversity (CBD) target also proposes the attachment of property rights for fisheries through individual transferable quotas (ITQs).

2.2 Empirical framework for analysis of MPA governance approaches

The challenges posed by the development of commitment, cooperation and compliance among common-pool resource (CPR) users are called collective action problems (CAPs). The empirical framework for MPA governance according to Jones (2014) should take the following aspects into consideration.

1. **Context** of MPA, including metrics such as:
   - Name, area and coastline length
   - Per capita gross domestic product (**GDP**; as a measure of the economic wealth of a country) and **GDP growth rate** (indication of how fast the economy is expanding or contracting)
   - **Main economic sectors** (relative contribution to GDP to determine priorities in job creation)
   - **State capacity** (voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption)
   - **Unemployment rate** and **population below poverty line**
   - Human Development Index (**HDI**; education, life expectancy and standard of living)
2. **Objectives** of a particular MPA will vary, but objectives tend to fall into nine inter-related categories (restoration and conservation of marine ecosystems, fish stocks and vulnerable habitats and species, contribution to MPA network/spatial planning, promotion of research and education, control of impact of tourism and recreation, maintenance of traditional uses, and recognition of the cultural symbolic value of set-aside areas)
3. **Drivers** (increasing populations and their demand for higher living standards, rising demand from globalised fish and tourism markets) and **conflicts** (mainly activities that restrict MPA objectives) will be discussed in further detail at the end of this section.
4. **Governance** framework/approach, i.e. the legal/policy hierarchy of which the MPA is a component including different degrees and types of **decentralisation**, defined as 'the transfer of authority from central government to lower-level government levels, quasi-independent government organisations, NGOs or the private sector'. There are three types of decentralisation: first, **deconcentration**, the transfer of power for implementation of decisions, but not for decision making; second, **delegation**, the transfer of some decision-making powers with a remaining degree of control from the central government over key aspects of policy; and third, **devolution**, the transfer of maximum feasible decision-making powers. MPA governance approaches can be employed in five categories:
   - **Governed primarily by the state under a clear legal framework**: some deconcentration or delegation may be transferred to lower level government, etc., which consult local users and stakeholders on decisions taken at a higher state level.
   - **Governed by the state with significant decentralisation and/or influence from private organisations**: implementation is deconcentrated to lower level government, etc., along with the delegation of some decision-making powers.
   - **Governed primarily by local communities under collective management arrangements**: bottom-up basis often through local organisations, with many implementation and decision-making powers delegated to local users/organisations, but which often require some degree of state support for enforcement.
   - **Governed primarily by the private sector and/or NGOs, which are granted property rights and associated management rights**: central government influence is generally limited to withdrawal rights if conditions are not met.
   - **No clearly recognisable effective governance framework in place**: so-called 'paper MPAs' without effective incentives; the central state or lower government levels often lacking the political will to manage effective MPAs and are sometimes involved, in partnership with the private sector, in development proposals that undermine MPA objectives.

5. **Effectiveness**, i.e. the control or reduction of activities that undermine MPA objectives in order to ameliorate or avoid conflicts.
6. Five categories of **incentives** to achieve MPA objectives in the face of driving forces, which will be outlined in further detail under 1.4:
    - **Economic** (market-based, use of economic and property rights to fulfil MPA objectives: payments for ecosystem service (PES), assignment of property rights, reduction of leakage of benefits, promotion of profitable and sustainable fisheries, green marketing and alternative livelihoods, provision of compensation, reinvestment of MPA income in local communities, ensuring sufficient state funding and provision of NGO and private sector funding)
    - **Interpretative** (promotion of conservation awareness and support for related measures: awareness raising among MPA users; promotion of the recognition of benefits, regulations and restrictions)
    - **Knowledge** (respect for and promotion of the use of different sources of knowledge, i.e. local-traditional and expert-scientific: promotion of collective learning, address uncertainty, independent advice and arbitration)
    - **Legal** (establishment and enforcement of relevant laws and regulations by the state: capacity for enforcement, penalties for deterrence, protection from incoming users, transparency and fairness)
    - **Participative** (promotion of the 'ownership' of all stakeholders and their potential to cooperate in implementation of decisions: decentralisation of responsibilities, peer enforcement, building social capital, bracing linkages, building on local customs)
7. Combination of incentives
8. Cross-cutting themes will also be mentioned again in the concluding section:
    - Role of **leadership** and **NGOs,** which play an important role in bridging different organisations, individual people and the state.
    - **Equity issues** ensure the equitable sharing of costs and benefits, and are central to the reaction of MPA users to proposals, often neglected in MPA analyses.

2.3 Case studies

Twenty MPAs were examined by Jones (2014): a summary of the main patterns emerging from the different governance approaches, and the main driving forces that must be addressed by the governance framework, will be given in the following.

Five MPAs in three countries (Australia, the UK and the US) showed that **government-led** approaches with a strong legal framework do not exclude opportunities for user participation. For example, the Great Barrier Reef Marine Park (GBRMP) rezoning process and the California MPAs under the Marine Life Protection Act (MLPA) are both good examples of a combination of stakeholder participation and scientific knowledge (Olsson et al. 2008, Gleason et al. 2010).

Decentralised MPA governance with a shared authority was found in seven case studies in six countries (China, Columbia, Ecuador, Indonesia, the Philippines and Vietnam). Since these countries have a relatively high proportion of people living below the poverty line and low per capita GDPs and HDIs, this approach seems to be characteristic of LEDCs. Although there is a degree of commitment to the conservation of marine biodiversity and promotion of sustainable fisheries, the state capacity is weak, hence the tendency towards decentralisation. As the state lacks the capacity to implement MPAs on a direct basis, users have a considerable influence on governance processes and decisions.

There is, however, a wide variation in the way that participation has been applied; e.g. in the Sanya Coral Reef National Marine Nature Reserve in China, most responsibilities have been decentralised to the local municipal government, which is working very closely with the tourism development sector. But local users have had very little influence, some having lost both their land and their access to marine areas in a manner that has raised equity and social justice concerns (Qiu 2013).

A **community-led** governance approach was found in two case studies (Spain and Mexico) that differed significantly in their socio-economic contexts. One of the major challenges to MPA governance in this approach is the vulnerability to changes in the wider socio-economic and political environment. Another concern is related to equity in that the power awarded to some community organisations and groups may exclude non-elite members of a community.

MPAs governed by the **private sector** were observed in two cases (the US and Tanzania). Remarkably, Chumbe Island Coral Park in Tanzania (the country with the lowest per capita GDP) had the highest effectiveness score of all the case studies. This may be attributed to the very strong leadership role of its founder, coupled with measures that spread the MPA's benefits to local communities (Nordlund et al. 2013). However, it must be recognised that Chumbe, at only 0.3 km^2, is also the smallest of all the case studies and that small MPAs tend to be more effective (Mascia et al. 2010).

Finally, three MPAs in two countries (Brazil and Croatia) had **no clearly recognisable governance framework**. Their effectiveness was lowest, possibly due to the limited use of economic and legal incentives, coupled with the influence of major infrastructure and economic development projects.

Various forces can drive user activities in such a way as to undermine the effectiveness of MPAs in achieving their objectives. The **main drivers** are:

- global fish markets (increased global reach and demand; increased fishing pressure from international trawlers; illegal, unreported and unregulated (IUU) fishing; related opportunities for drug smuggling, people trafficking, forced labour, etc.)
- tourism (increased reach and number of tourists)
- coastal development (large-scale economic development; urbanisation and infrastructure projects such as mass tourism hotels, port expansions and the intensification of agriculture)
- poverty (high dependence on marine resources; collective undermining of objectives by many small-scale users; equity issues)
- aspiration (desire to improve standard of living; aspire to a more secure, comfortable and technological 'western' lifestyle)
- migration (towards coastal areas that are developing economically, usually in combination with poverty and aspiration)

2.4 Incentives for effectiveness

A variety of incentives, defined as 'particular institutions that are instrumentally designed to encourage actors to choose to behave in a manner that provides for certain strategic policy outcomes, particularly MPA objectives, to be achieved', have been applied to face the challenges raised by the driving forces mentioned above. This section will go into further detail on the five categories of incentives, including examples of how and where they have been applied in the 20 case studies.

1. Economic
    - Payments for marine ecosystem services (**PESs**) currently focus mainly on 'blue carbon initiatives', which provide payments for the sustained use of mangrove, tidal marsh and sea grass habitats as carbon sinks to mitigate climate change. 'Blue carbon initiatives' are still in their infancy, which is probably the reason why none of the case studies applied PESs as an incentive. Additionally, it should be noted that many marine habitats of protected areas are not major carbon sinks.
    - Assignment of **property rights** for certain marine areas and fisheries to groups of people to promote ownership, stewardship and rational self-interest in sustainable exploitation is argued to be more effective than protected area designation itself. While approaches such as ITQs, assigned to a particular community of fishers for a particular area, or 'territorial user rights in fisheries' (TURFs) are aimed primarily at the achievement of sustainable natural resource use, areas managed by fishermen through such rights can show add-on biodiversity conservation benefits. This demonstrates that rights-based approaches to fisheries management are more effective than many actual MPAs.
    - Measures to **reduce the leakage of benefits** aim at providing local people who may bear some of the costs associated with access restrictions to natural resources in a MPA with the ability to yield a sufficient proportion of the benefits. This may include increased harvests on the edge of no-take areas (also no-take zones; NTZs) or an income from sustainable tourism. The 'Seaflower' MPA in the San Andres Archipelago in Colombia, for instance, provide several fishing zones for traditional fishers adjacent to NTZs to ensure that the benefits of any export/spill-over go mainly to local fishermen (Taylor et al. 2013). And in the Isla Natividad MPA in Mexico, intrusion by incoming dive and surf operators is restricted so that locals can run such activities themselves.
    - Promotion of **profitable and sustainable fisheries** may include the restriction of harvests to MSY levels and restrictions or banning of fishing methods that can impact conservation features. No-take MPAs or areas that included NTZs recognised benefits for surrounding fisheries (e.g., Dygico et al. 2013).
    - Promotion of **green marketing** of (eco-)tourism, fish, and other products from MPAs may also include a more direct connection of local users to external markets, so that they receive a greater proportion of the sale value.
    - The success of promotion of **alternative livelihoods** and small-scale commercial activities has so far not been evaluated. There are concerns that they may be economically unsustainable or fail to compensate for loss of access to MPA resources.
    - Provision of **compensation** may happen at a national scale, whereby the government receives compensation from a trust fund for the loss of revenue as a result of lost sales of fishing licences to foreign vessels. Usually, however, compensation is paid by national governments to individual fishermen. But there are concerns that such compensation does not reach all excluded users or does not fully compensate local users. In addition, compensation costs can increase out of reasonable proportion. At GBRMP, for example, an initial budget of AUS$10 million for a structural adjustment package (SAP) spiralled out of control to $250 million.
    - **Reinvestment of** MPA income **in local facilities** (schools, medical care, etc.) **and infrastructure** (roads, electricity, water, etc.) has been applied successfully in many cases.

- Ensuring **sufficient state funding** has proven to be crucial for the effective support and enforcement of MPA restrictions, as a large proportion of the funding in most of the case studies was provided by the state.
- Provision of **NGO and private sector funding** may also be a very important supplement to funding from the state.

2. Interpretative
   - **Awareness raising** through media and various other approaches (leaflets, posters, web pages, apps, newspaper/magazine articles, TV features, school education programmes, community events, etc.) aim at overcoming overcome 'out of sight, out of mind' hurdles. They are a vital element of MPA governance and constitute a well-established technique in environmental education. Tubbataha Reefs Natural Park in the Philippines, for instance, used publicly recognised 'champions', such as sports and TV personalities, to promote awareness. Furthermore, the NGO RARE (www.rareconservation.org) raised a 'pride campaign' at this MPA with the use of private sector marketing tactics to 'sell' social change in order to alter people's perceptions and practices.
   - Promotion of **recognition of regulations and restrictions** is necessary to make people aware of an MPA's limits, particularly its boundaries. In order to promote voluntary cooperation, people who choose to cooperate need to know that those who do not are penalised.
   - Promotion of **recognition of benefits** in terms of spill-over/export, insurance in the face of uncertainty, increased tourism, etc., was applied in half the case studies. It is, however, important to be realistic about the potential benefits and not 'over-sell' them.
3. Knowledge
   - Promotion of **collective learning** by combining and integrating the traditional knowledge of local users with the scientific knowledge of 'experts' is essential for the adaptive management of social-ecological systems. In California, for example, joint fact-finding workshops were organised between stakeholders and scientists, which both improved the information base and the acceptability of the MPA proposals (Saarman & Carr 2013). MPAs are now being monitored on a partnership basis between stakeholders, state agencies, research scientists and NGOs.
   - Agreement on approaches to **address uncertainty** focuses on the need to explicitly recognise the challenges raised by scientific uncertainty, e.g. the precautionary principle (a key rationale for no-take MPAs (Murray et al. 1999)), decision making under uncertainty and adaptation under emerging knowledge.
   - **Independent advice and arbitration** in the face of conflicting information, etc. (see point above) needs the collectively accepted validity of the independent advisor(s) and/or arbitrator(s). If necessary, such a platform or task force has the remit to reach a decision or give advice on a disagreement or complex issue to which there is no simple answer.
4. Legal
   - **Hierarchical obligations** focus on legal obligations to achieve objectives from higher institutional levels, including the potential for top-down intervention if these obligations are not met.
   - **Capacity for enforcement** includes the assurance that sufficient state capacity, political will, surveillance technologies and financial resources are available to ensure the equitable and effective enforcement of restrictions on local and incoming users. This is a

critically 'sharp end' of governance, because the potential for cooperation among users willing to adhere to MPA restrictions is undermined if a minority is able to breach restrictions for their personal short-term gain. In LEDCs in particular with many locally managed marine areas (LMMAs; www.lmmanetwork.org), there may be insufficient enforcement capacity at a local level to counter driving forces, such as incoming fishermen. In the Karimunjawa Marine National Park in Indonesia, for instance, enforcement is hampered by insufficient financial resources for patrols and a lack of political will in the face of strong driving forces, such as market demand coupled with local poverty (Campbell et al. 2013). But the enhanced integration of the MPA in the district fishery authority's enforcement programmes promises improvement.

- **Penalties for deterrence** are generally not a particular challenge in governmental-led MPAs. In some cases in other governance approach categories, unsuccessful prosecutions were due to long delays in proceeding, suspects being only briefly detained and released after a non-binding warning, and corrupt links between offenders and the state.
- **Protection from incoming users** through the establishment of alliances between the state and local users is thought to be one of the principal benefits of co-management. This incentive is closely related to the economic incentive of assignment of property rights to local users.
- **Attachment of conditions to property rights,** such as legally binding environmental performance conditions, breaches of which can lead to the withdrawal of the rights and/or prosecution, once again suggests the state as a regulating authority. However, the allocation of property rights should result as a decentralisation of authority. For example, in the Isla Natividad MPA in Mexico, the renewal of fishing concessions is contingent on annual stock assessments, which ensure that the stocks are being managed sustainably (Sharma & Rajagopalan 2013).
- **Cross-jurisdictional coordination** focuses on ensuring that decisions taken for other sectoral activities, such as fishing, coastal development or terrestrial run-off, are consistent with and contribute to the achievement of MPA objectives. This usually requires the inclusion of other government authorities in addition to those responsible for the MPA. In the Galápagos Marine Reserve, an MPA that has to deal with several irregularities, a lack of coordination between the MPA authorities, the navy, the air force and municipal governments has hampered enforcement so far, but is improving as Ecuador recovers from a long period of political instability (Jones 2013).
- **Clear and consistent legal definitions** are not only important in defining the MPA objectives, but also play a crucial role in promotion of the implementation of other legal incentives, particularly cross-jurisdictional coordination. In this respect, the BRRMP serves as a model example.
- Clarity concerning **jurisdictional limitations** includes the recognition of driving forces, activities and impacts that can not be directly addressed by the MPA legislative framework. This is important in the prevention of misunderstandings and frustrations among users and regulators if it is perceived that certain issues are being ignored.
- **Legal adjudication platforms** are often provided with independent scientific advice whenever conflicts arise that can not be resolved among users and regulators within the MPA's governance framework. At 'Seaflower', for instance, a government decision to grant oil exploration and development licences was challenged through a 'People's

Action' by the MPA agency CORALINA and referred to an independent legal tribunal; this led to a revocation of the licences as they were in breach of the CBD (Taylor et al. 2013).

- **Transparency, justice and fairness** in the management process, e.g. statutory requirements for public access to information, provision for appeals by users and regulators, and public hearings are important for a societally acceptable balance between the promotion of MPA effectiveness and an equitable outcome.

5. Participative
   - **Rules for participation** should recognise the fact that it is not feasible to involve a large number of people in collaborative platforms, and therefore particular groups of users have to be represented by selected individuals. This raises challenges related to several questions, such as how to delineate particular groups of users and the degree of influence they can expect to have.
   - Establishment of **collaborative platforms** involves structures and processes that allow an appropriate degree of user participation in deliberations and decision on MPA planning and management issues.
   - **Neutral facilitation** is recommended through professional independent facilitators. It may have significant financial implications, but the benefits gained in terms of maximising the potential for agreement and cooperation among MPA actors often more than outweighs the costs.
   - **Independent arbitration panels** should be represented by people with the relevant expertise but no actual stake in the particular MPA. The relatively recent recognition of its potential benefit and the organisational challenges of such panels are the reasons why this was perhaps the least applied incentives in all the case studies. The only example is the MLPA MPA network along the Californian coastline where four 'Blue Ribbon Task Forces' (BRTF) were formed, one for each sub-region (Saarman & Carr 2013). Each BRTF consisted of eight people drawn from various public and private sector organisations, who, in collaboration with a scientific advisory team, reviewed the MPA proposals and made final configuration recommendations to the Fish and Game Commission. The Commission's final decision making often corresponded to these recommendations. Additionally, the BRTF played a significant role in making suggestions where agreement could not be reached among stakeholders, showing the considerable potential of such panels to progress governance processes fairly and impartially.
   - **Decentralisation of responsibilities** may be applied as deconcentration, delegation or devolution, as explained in section 1.2 above.
   - **Peer enforcement** is defined as the potential for users to promote each other's compliance, and is one of the many benefits of bottom-up MPA management approaches. A more subtle form of peer enforcement is the knowledge that other users comply with a standard, thus creating an assumption that such compliance is normal. More direct measures may include reporting of or sanctions against transgressors, e.g. social marginalisation, loss of social status or access to community resources, and even threats of vandalism or violence.
   - **Building social capital** is central to neo-institutional theories as it provides for self-governance. Social capital defines to what degree actors reach and implement decisions together, based on the development of mutual trust and confidence in reciprocal cooperation. Typically, social capital is generated particularly well through face-to-face meetings/discussions and transparency and equity (Ostrom 1998).

- **Bracing linkages** will often need to be instrumentally developed by state actors in order to reinforce partnerships with key people in civilian society. The aim then is that these people will be able to influence others, eventually weaving a network of horizontal and vertical linkages.
- **Building on local customs** aims to promote consistency with and respect for local traditions, customs, norm and practices in the development of the MPA governance framework. This can be challenging as such practices are not always compatible with meeting the objectives of marine biodiversity conservation.
- **Potential to influence higher institutional levels** involves vertical linkages that allow feedback (e.g. consultation responses, feedback questionnaires and collaborative committees) and can lead to revisions at higher levels. A good example of this incentive is once again the 'Seaflower' MPA mentioned earlier. This decentralised MPA is driven largely by local users working alongside CORALINA (Taylor et al. 2013).

2.5 Cross-cutting themes and general conclusions

In the 20 case studies, the incentive most often used was awareness raising, followed by provision of NGO and private sector funding, promotion of collective learning and establishment of collaborative platforms. By contrast, the four incentives most frequently cited as being required were all of a legal nature: capacity for enforcement (14 case studies), cross-jurisdictional coordination (10 case studies), clear and consistent legal definitions (six case studies) and hierarchical obligations (five case studies).

The three cross-cutting issues (introduced in section 1.2) include the **role of leadership**. This theme is not just confined to the role of promotion of the participation and priorities of local users, but also includes the important task of development of the political will that is often critically important for MPA effectiveness and which can be undertaken by particular people in government positions. The **role of NGOs** is another important cross-cutting theme, depending largely on which governance approach the MPA represents. Additionally, NGOs come in a variety of sizes, ranging from small organisations, focused on promotion of the rights and welfare of local communities, to big international NGOs (BINGOs), focused on national and international lobbying for more MPA designations and governance effectiveness (e.g. the 'Global Ocean Legacy'). In government-led MPAs, NGOs tend to play more indirect roles, focused on provision of additional funding or on lobbying the government. In decentralised MPAs, NGOs tend to play more direct roles as they often provide a greater proportion of the funding and therefore some governance responsibilities may be decentralised to them; e.g. the 'Coral Triangle Initiative', funded mainly by three BINGOs, has been very influential in promoting a network approach to MPAs in the Philippine and Indonesian case studies. In community-led MPAs, NGOs support and work closely alongside local communities in designating and governing MPAs. A successful example of a private MPA is Chumbe, where a private individual financed and took the lead (Nordlund et al. 2013). Even in MPAs categorised as ineffective, NGOs played key roles but were not able to modify the lack of political will and related legal incentives from the state. In conclusion, it has to be stated that the case study analyses conducted by Jones did not include in-depth ethnological studies among actual users of the MPAs that may have revealed negative effects of NGOs, such as the adoption of a quasi-state role without the legitimacy and accountability of the state, the imposition of conservationist values on users or the marginalisation of 'traditional' users. The third cross-cutting theme concerns **equity issues;** these can be very challenging in terms of balancing the achievement of conservation objectives, which often include restrictions on particular users, against the fair distribution of costs and benefits. In both top-

down and bottom-up approaches, local communities can be marginalised and rarely are win-win solutions reached. Equity issues can be multi-faceted and may be considered in terms of social and environmental justice. Social justice relates to concerns that certain people bear an unfair proportion of the costs caused by MPA restrictions, and environmental justice relates to concerns that some people bear an unfair proportion of the costs related to the impact of particular uses of a MPA; e.g. the loss of climate mitigation potential and ecosystem services as a result of the impact of fishing. In LEDCs, the loss of access to natural resources may leave marginalised users few options other than to breach restrictions in order to subsist. One case study worth mentioning is the Wakatobi National Park in eastern Indonesia, categorised as governed as a decentralised MPA (see following chapter).

In conclusion, Jones (2014) recommends the application of incentives comparable to synecology, where many species interact to constitute a structurally and functionally integrated, diverse and resilient ecosystem. In this way, the interaction of a combination of incentives has the greatest potential for a successful governance system, creating an upward co-evolutionary spiral of cooperation and effectiveness. Jones also emphasises the importance of the role of the state in enabling and supporting the implementation of various incentives, regardless of the MPA's governance approach. In the face of the increasing diversity, magnitude and reach of driving forces, this becomes a crucial aspect in counteracting any perturbation or undermining of MPA governance systems, especially in recovering LEDCs that are engaging rapidly with the global economy; e.g. China and Brazil.

3. Marine Protected Areas in the Coral Triangle

The Coral Triangle is a marine area located in the western Pacific Ocean, covering approximately 5.7 million km^2 of the waters of Indonesia, Malaysia, the Philippines, Papua New Guinea, the Solomon Islands and Timor Leste. The Coral Triangle is defined by marine zones containing nearly 600 species of reef-building coral which constitute more than 75% of all known coral species. The region also nurtures six of the world's seven marine turtle species and more than 2000 species of reef fish. Additionally, the Coral Triangle supports livelihoods and provides income and food security for 120 million people living in coastal communities (ADB, CTI-CFF, GEF 2014).

Currently, 1,972 MPAs are listed or established in the Coral Triangle, covering about 200,000 km^2 (Coral Triangle Initiative on Coral Reefs 2013). Hence, only a very small area in the Coral Triangle region is managed or protected, well below the Regional Plan of Action target to protect 20% by the year 2020, as endorsed in 2009 by the Coral Triangle Initiative for Coral Reefs, Fisheries and Food Security (ADB, CTI-CFF, GEF 2014). However, planning and implementation of MPAs are complex and challenging, especially for multinational initiatives such as the CTI-CFF (Fidelman et al. 2011). Very few MPAs in the Coral Triangle are managed effectively, many lacking in good governance and enforcement (Green et al. 2014, Walton et al. 2014)

A key area of concern in the establishment of MPAs is the socio-economic and cultural aspects of fisheries management. Small marine protected areas in the Coral Triangle that are governed by local communities and designed to meet community goals rather than primarily biodiversity conservation aims may provide greater improvement in biodiversity than larger government-controlled MPAs (McClanahan et al. 2006).

Recent literature shows that fisheries development projects that aim to improve local fishers' livelihoods have often failed to achieve this objective because of a lack of understanding of coastal communities and their institutional contexts. Over-fishing may often be caused by a lack of alternative livelihoods and prevailing political conditions. It is therefore most important for MPA effectiveness that local communities are helped to adapt to new fishing restrictions associated with MPA designation.

Protected areas in the developing world are commonly subject to severe budgetary constraints that hamper the ability of managers to implement essential monitoring, education and enforcement activities to achieve conservation goals. Furthermore, the inequitable distribution of income derived from tourism, along with perceptions of inappropriate restrictions on fishing activity, may degrade any support from resident communities within an MPA (Christie 2004). McClanahan et al. (2008) highlighted the discrepancy of MPA designation in areas characterised by low adaptive capacity in the western Indian Ocean. This issue may be equally crucial to the Coral Triangle countries, given the widespread poverty, limited occupational mobility and low food security common among fishing communities in this region. However, so far there is little indication as to how these countries plan to address this matter (Clifton 2009).

Additionally, managers and scientists unfortunately often tend to doubt the willingness or competence of local community members to assume planning, management and decision-making responsibilities (Gustave & Borchers 2009). It is, however, crucial for environmentalists to recognise the social and political complexities, as well as the knowledge paradigms and institutional structures that characterise communities. Science-based knowledge paradigms on which MPA initiatives are commonly framed remain critical points of reference, but how such knowledge is understood and accepted by local communities is still an important field of ongoing investigation. Clifton (2013) even suggests that as long as programmes are based primarily on a conservation rooted in western

scientific thought, inequity within communities will persist, inevitably undermining the effectiveness of MPAs.

This chapter therefore focuses on case studies in the Coral Triangle that demonstrate how various local fishing communities have been approached in the implementation process of MPAs, and how the provision of alternative livelihoods has been managed.

3.1 Indonesia

Over the past two decades, attempts have been accelerated to protect coastal and marine waters by establishing MPAs or Marine Conservation Areas (MCAs), as they are often called in Indonesia. Of all MPAs in the Coral Triangle, Indonesia has the largest total area (more than 90%).

Several recurrent problems hinder conservation area management in Indonesia. A rapidly expanding and increasingly mobile population, emerging international markets for valuable marine commodities, lack of defensive marine boundaries, and conflicting government policies at national and district level are just some of the issues currently facing marine conservation efforts (Majors 2008). The partial decentralisation of government in Indonesia has led to political tensions between central and district governments over protected areas. The Ministry of Forestry's Directorate General of Forest Protection and Nature Conservation (PHKA) was originally in charge of the establishment of marine park areas. But in 2002 the newly instituted Ministry of Marine Affairs and Fisheries (MMAF) introduced the concept of district MCAs, allowing a district to propose a new area to the central government (Kusumawati & Visser 2014). Given the overlapping and sometimes contradictory legislation affecting marine conservation in Indonesia, the absence of a clear and consistent legal framework across all relevant sectors is a clear hindrance to effective park management (Clifton 2013). Additionally, the lack of adequate funding has led to the operation of many national parks on a minimal budget, leading to inefficient enforcement of regulations. Most complex, however, are the ongoing disputes with local communities throughout Indonesia.

- **Berau Marine Conservation Area**

The Berau Marine Conservation Area, located among Pulau Panjang (Long Island), Karangtigau Cape and Baliktaba Reef, has the second highest coral reef biodiversity in Indonesia after Raja Ampat Islands and the third highest in the world. This 12,700 km^2 MPA was established in 2005 in collaboration between the Berau district government and international environmental NGOs such as TNC and the WWF.

The Nature Conservancy Marine Program (TNC-Marine), WWF-Indonesia and local NGOs, together with the various technical agencies in the district government, formed the Steering Committee for the Berau MCA. However, the district government did not fulfil its management obligations and eventually TNC-Marine and WWF-Indonesia tried to influence the government's authority (Kusumawati & Visser 2014). Decentralisation in Berau has meant that the district government has had to finance regional development out of its own pocket. One of the strategies applied by the Marine Affairs and Fisheries Office (Dinas Kelautan dan Perikanan) was the sale of fishing permits to outside fishermen, which although legal both local fishers and environmental NGOs perceived as illegitimate (Gunawan & Visser 2010). Generally, marine conservation was not a priority for the Berau government. Another dilemma was that the Fisheries Office focused mainly on shrimp farm development in the coastal areas, neglecting the design of fisheries-based social programmes for the coastal communities. Additionally, in the eyes of the district government, the NGOs' joint programme came to be perceived as an external plan that lacked governance authority

and legitimation. In 2010, the non-local NGOs dissolved their partnership with the district government.

- **Karimunjawa Marine National Park**

Situated in the Java sea, Karimunjawa Marine National Park today includes a total of 27 islands (with a resident population of about 9,000), comprising a marine area of 1101 km^2. In early 1999, the whole Karimunjawa archipelago was declared the Karimunjawa Marine National Park and in 2001 all marine waters of Karimunjawa National Park were designated as a marine conservation area, with a new 25-year management plan produced in 2005. The revised zoning plan of 2012 now includes maritime protection and tourism zones twice as large as before, an increase in mariculture areas coverage and the establishment of a zone to protect religious and historic features. The park is managed by the Karimunjawa National Park Authority (KNPA) within the Ministry of Forestry. Furthermore, international NGOs such as the Wildlife Conservation Society (WCS) and RARE have given technical and financial assistance to the KNPA.

Karimunjawa has shown that MPA policies and regulations can improve the social well-being and political power of fishing communities, particularly when appropriate economic, legal and participatory incentives are provided. Since 2005, communities have been more involved in park management and implementation of strategies leading to ecological improvement, such as the stabilisation of reef fish biomass, and have helped to reduce destructive fishing (Campbell et al. 2013). Positives changes since 2009 are related to both increasing governmental efforts to improve community awareness of fishing regulations and the growing perception among fishers that fisheries have indeed been depleted. As a result, complementary new industries such as tourism, which provide increased disposable income, have been supported. The government and NGOs have been initiating community and tourism development programmes (e.g. training for community tourism enterprises, or the RARE PRIDE campaign) since 2010. However, although laws to protect the park are in place, enforcement leaves room for improvement, particularly in relation to alignment (Campbell et al. 2013).

- **Komodo National Park**

Komodoo National Park (KNP), encompassing nearly 2000 km^2 of land and sea, is located at the western tip of Flores and was originally declared a national park in 1980 to conserve the Komodo dragon (V*aranus komodoensis*) and its habitat. In 1991, the park, including its marine realms, was also designated a World Heritage Site and a Man and Biosphere Reserve by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). To date, the majority of the people living within the park (97%) continue to rely on marine resource use as their only source of income (Mous et al. 2004).

KNP is a prime example of how global objectives in conservation can conflict with local realities. The involvement of The Nature Conservancy (TNC) in the management of the park has intensified a historic conflict between park managers and fishing communities (Gustave & Borchers 2008). With a population of about 4,000, local communities have been increasingly marginalised and their resource-use rights curtailed since KNP's designation.

In 1995, TNC joined with the Indonesian National Park Authority (PHKA; currently, the Direktorat Jenderal Perlindungan Hutan dan Konservasi Alam, Indonesia) to support the park's management. Five years later, the PHKA and TNC endorsed a 25-year management Master Plan: the Komodo Collaborative Management Initiative (KCMI), in which the concept of co-management was considered the most appropriate approach to park management (Mous et al. 2004). The acceptance

of the KCMI by local communities was assumed without any preceding consultation (Gustave & Borchers 2008).

KNP was also a pilot site to test new park financing mechanisms related to the joint venture company PT. Putri Naga Komodo (PNK), established between TNC (which owns 60% of PNK) and the Indonesian tourist operator PT. Jaytasha Putrindo Utama (JPU) in 2001. The plan provided that over seven years the management of the national park would shift from a public to a self-financed public-private partnership through commercial revenue from tourism. The partnership was also structured to generate funds for community and microenterprise development, and expand tourism by development of marketing materials and enhanced infrastructure. Hence, as of 2001, KCMI included the involvement of PNK, the National Park Authority and the local district government, with participation from a community-based advisory committee. However, the project began to face severe management challenges in 2007, with some of these challenges remaining unresolved three years later (Agardy et al. 2011).

In 2001, again without any consultation or explanation, the government passed a regulation that banned almost all types of equipment used by fishermen and severely restricted their movements. Interviews with local people revealed that increased patrolling activities were most keenly felt by the fishing community (Gustave CIT.). According to the Indonesian Forum for the Environment (WALHI; Wahana Lingkungan Hidup Indonesia), routine floating patrols have operated in an extremely violent fashion, with arrests, evictions, injuries and even deaths (three fishermen were shot dead over a four-month period in 2002–2003), resulting from the 'enforcement and protection' strategy (Pannell 2013).

The International Financial Corporation (IFC), which helped craft and execute the KCMI, exited the project two years before completion of the seven-year implementation plan (Agardy et al. 2011). A final evaluation of the KCMI undertaken in 2010, performed for the Global Environment Facility (GEF) and the IFC, rated the overall effectiveness of the project as unsatisfactory. As of 2005, the IFC and TNC had each invested a total of more than $5 million over a five-year period, in stark contrast to a total of only about $1.5 million generated by the PNK during the same period. Although the KCMI has achieved most of its expected outcomes and seems to be on its way to delivering its impacts, implementation has been hampered by several challenges, most of which are external to PNK and the project. However, unresolved issues between TNC and JPU, including the implementation of a parallel fee collection system by the Ministry of Forests, in addition to the unwillingness of the government to fully comply with PNK are thought to be among the main reasons for PNK's stranding. A recent mandate from the Ministry of Foreign Affairs ordered TNC to sell its shares, arguing that as an international NGO it is illegal for it to own a for-profit company in Indonesia (Agardy et al. 2011). Although the latest changes in KNP's management could not be pursued completely by the author, it seems that at this date (mid-2014), PNK has been dissolved and that TNC has terminated its involvement in the KNP.

In terms of the management of sustainable alternative livelihoods, very few specific quantitative or qualitative impact outcome targets have been established and referred to by the KCMI. Remarkably, no attention has been paid to the development of alternative livelihoods for communities located further afield, primarily in Western Flores, which reportedly account for most of the destructive and unsustainable fishing practices (Agardy et al. 2011). Similarly, while reference was made to the development of an adaptive management system, little evidence exists of such a system in use. As the most feasible livelihood alternative for local communities, the management plan suggested the development of seaweed culture, the pelagic fishing industry and the development of fish culture targeting the live reef fish industry. The decision to focus on these

market segments seems to have stemmed primarily from TNC's historic engagement in KNP rather than an objective assessment of various options (Agardy et al. 2011). It is therefore not surprising that little demonstrable progress has been made in establishing viable pilot projects, or that actual final results have been minimal. Although quite small in terms of total sales, perhaps the most successful alternative livelihood initiative was the development of women's cooperatives that produce handicrafts products for sale to tourists.

Tourism management has generally received high ratings in previous evaluations and remains one of the successful outcomes of the KCMI (Agardy et al. 2011). Additionally, the KMCI should be credited for a reduction of destructive fishing practices, and a rejuvenation of the ecosystem seems to be underway (Gustave & Borchers 2009). Community development was successful initially, with improved medical attention, support for schools and training programmes, and the development of village infrastructure (Agardy et al. 2011). Over the course of time, however, the maintenance of these institutions and infrastructure has been neglected.

- **Wakatobi National Park**

Wakatobi (an acronym for the four main islands of Wangi-Wangi, Kaledupa, Tomia and Binongko) is an archipelago at the southeastern tip of Sulawesi, and home to about 100,000 people. The majority of park residents are of local Butonese origin, together with the Bajau ethnic group with approximately 7,000 people in six settlements across the islands (Clifton 2013). In 1996, the Indonesian government declared 13,900 m^2 of the islands and the waters around them a protected area. Hence, it is Indonesia's third largest and arguably one of its most important MPAs. Wakatobi National Park (WNP) has been listed as a UNESCO tentative World Heritage Site since 2005, and it was designated a World Biosphere Reserve in 2012.

According to environmentalists, it is the use of destructive fishing practices, such as blast- and cyanide-fishing, more than any other factor that has contributed towards the widespread degradation of Wakatobi's unique marine environment. Furthermore, local fishers are known to exploit stocks of protected species and corals. Hence, the World Bank Coremap programme and a consortium involving The Nature Conservancy (TNC) and the World Wide Fund for Nature (WWF), working in cooperation with the National Park Authority of Wakatobi (BTNKW; Balai Taman Nasional Kepulauan Wakatobi), have made a significant commitment to conservation projects in the region. No-take areas are promoted as a community-owned resource that ensure long-term fishing viability, and are repackaged as 'Tabungan' or community deposit accounts that every community should have. These areas are particularly important in the protection of spawning aggregation sites to enable the reproduction and replenishment of highly valued grouper stocks (Majors 2008).

The indigenous fishing population, known as the Bajau, have come to dominate fishing within the national park. The close relationship the Bajau have with their marine environment is reflected by their former lifestyle when they moved as nomadic family units by boat. Today, the recent sedentarisation of this group might appear to favour the promotion of stewardship of nearby fishing grounds. However, the Bajau traditionally view marine resources for their subsistence use and tend not to participate in collaborative platforms or take up alternative livelihoods (Clifton 2013). Both Coremap and TNC/WWF projects relied heavily on awareness raising among local Bajau communities in order to include them as stakeholders in the management of the park. A desired output of this process was that each village would create its own 'resource-management-plan'. Inequities exacerbated by incoming NGOs and dive tourism operators may be better addressed by the economic incentive of assignment of property rights to traditional users. However, the Bajau people may not recognise confinement to a specific zone given their former nomadic lifestyle. Additionally,

they are resistant to official top-down initiatives, such as MPAs, as they are not part of their traditional way of life. Therefore, involvement of the Bajau people in awareness raising or collaborative platforms may be challenging (Clifton & Majors 2012).

The Bajau make use of a range of fishing practises, operating in and targeting different habitats and species. Their perception of fish stock decline is surprisingly diverse, with fishermen who use more traditional fishing methods in deep-water environments claiming not to have observed any decline in fish stocks (Majors 2008).

Although destructive fishing practices today are on the decline, this has largely been the result of enforcement efforts by government agencies rather than greater awareness among the Bajau themselves. Destructive fishing methods are almost always linked back to informal village leaders who participate in wider social networks and are not intimidated by enforcement laws (Majors 2008). Blast-fishing, for instance, provides an opportunity for many fishers to benefit from the physical and legal risks taken by destructive fishers, thus raising their profile. Additionally, the Bajau have a tradition of sharing their catches; those who share in the catch are recognised within the community and can use this to their advantage in other social situations. Therefore, paradoxically, the imprisonment and attempts to halt destructive fishing have backfired, since these fishermen are portrayed as heroes and the rangers as villains. In terms of exploitation of protected species, a black market for Napoleon wrasse and green turtles continues despite the best efforts of environmentalists. The Bajau have been particularly angered by the confiscation of captured turtles without any form of compensation (Clifton 2013).

The initiation of marine reserves, regulation of destructive fishing practices and the exploitation of protected species have served to galvanise community feeling against the marine park. Fishing restrictions contradict what the Bajau have taken for granted for generations and which are therefore perceived to be traditional rights. In conclusion, the belief that a well-coordinated combination of education and awareness raising, economic incentives and strict regulation can change the way communities think about and behave within their environment fails to recognise that knowledge systems and relationships in which local practices are embedded are not easily given up. Nor can this local knowledge simply be replaced without altering other important aspects of a people's culture and society (Clifton & Majors 2012).

3.2 Malaysia

Malaysia is one of the lead countries in the Sulu-Sulawesi Marine Ecoregion (SSME) and the Peninsular Malaysia Seas Programme (ADB, CTI-CFF, GEF 2014). Both fall within the area of the Coral Triangle Initiative and support the Malaysian Coral Triangle National Plan of Action and the Sulu-Sulawesi Marine Ecoregion Tri-national Conservation Plan. The two priority areas capture more than 50% of Malaysia's coral reefs and 75% of fish landings. Kota Marudu in Sabah, for instance, is being groomed as a CTI model site, where several actions are taking place, including the farming of sea cucumbers and mangrove resource management. Furthermore, Sabah's proposed Tun Mustapha Park has approximately 1.02 million hectares and would become the largest marine park in Malaysia, encompassing 10,200 km^2 (see, for instance, CTI-CFF & CTSP 2011).

3.3 Papua New Guinea

Papua New Guinea has joined the Arafura-Timor Seas Programme and is a partner in the Bismarck-Solomon Seas Marine Ecoregion (BSSME). At the moment, no large-scale MPA exists in Papua New Guinea, although a large wildlife management area in Western Province, the Maza WMA, also focuses on the protection of turtles and dugongs (ADB, CTI-CFF, GEF 2014). A protected region worth mentioning, albeit with little relevant literature so far, is the Kimbe Bay Marine Management Area, a network of 11 locally managed marine areas (LMMAs).

3.4 The Philippines

In the Coral Triangle region, the Philippines has the greatest number of MPAs (about 80% of the total), mainly small community or local government-based MPAs. The CTI Regional Plan of Action for the establishment and effective management of MPAs supports the Philippines Fisheries Code of 1998, which requires that 15% of coastal municipal waters must be protected within no-take MPAs. As of 2008, at least 985 MPAs had been established in the Philippines, covering an aggregate area of 14,943 km^2, of which 1,459 km^2 had been designated as no-take (Weeks et al. 2009). Community-based MPAs, representing 95% of the total MPAs, have a combined no-take area of only 206 km^2, while two nationally designated no-take MPAs, the Tubbataha Reefs Natural Park (970 km^2) and the Apo Reef Natural Park (275 km^2), have a combined area of 1245 km^2, corresponding to 85% of the total no-take area (Weeks et al. 2009). Even though the Philippines is a leading country in the successful implementation of the CTI Regional Plan of Action, the establishment and effective management of large no-take MPAs in the face of diminishing marine resources and rapidly increasing coastal populations is still a real governance challenge (Dygico et al. 2013).

- **Tubbataha Reefs Natural Park**

The Tubbataha Reefs Natural Park (TRNP) was established in 1988 and is the largest no-take MPA in the Philippines. It harbours a significant diversity of marine life and is home to at least 360 species of corals or almost 72% of all coral genera in the world, 600 species of fish and 19 species of rays and sharks. Located in the middle of the Sulu Sea, approximately 150 km from Puerto Princesa, and under the political jurisdiction of the Municipality of Cagayancillo, TRNO is widely recognised as an outstandingly good practice example of MPA management (Dygico et al. 2013). In 1993, the park was declared a UNESCO World Heritage Site and in 1999 it was included in the Ramsar List of Wetlands of International Importance. Today, diver fees, no-take zones and expansion of park boundaries have clearly helped to increase marine biomass. Furthermore, sustainable ecotourism, mariculture and microfinances have aided the livelihood development of the Cagayancillo community (approximately 6,000 households). Encouragement of the local stakeholder community to participate at early planning phases has proven to be a key element in the success, as in 1998 this group deliberately decided to forego fishing access in Tubbataha. If this decision had been enforced, the resistance to TRNP's legislation may have been greater than it is today.

TRNP's governance approach could be best described as government management with significant decentralisation and influence from private organisations (Jones et al. 2011). The Tubbataha Protected Area Management Board (TPAMB) is the policy-making body of the TRNP. It was created in 1999 and consists of 20 representatives from the national, provincial and municipal governments, Cagayancillo people's organisation, NGOs, local universities and dive tourism operators. In the updated Park Management Plan of January 2011, TPAMB listed solid waste materials, crown-of-thorns starfishes (COTS) (*Acanthaster planci*), invasive seabird species and

climate change as priority biological threats. Socio-economic issues were identified as a missing sense of stakeholders ownership due to limited seasonal access, which allows only three months of tourist operation, an ongoing illegal use of resources by fishers from communities in mainland Palawan and the nearby provinces in the Visayas, and the rising cost of imported fossil fuel, which potentially increases the possibility that the Department of Energy will allow oil exploration in the Sulu Sea (Dygico et al. 2013). Additionally, there appear to be institutional constraints such as the slow judicial process within the Philippines' legal system, financial insecurity as conservation fees collected from tourism remain insufficient to fund the rising cost of management, and political dynamics that have hampered the transition of TPAMB and the Tubbataha Management Office (TMO) to an independent government agency.

Evaluation of the socio-economic aspect of management in 2008 showed that TRNP appears to be effectively attaining its objectives, with an increased fish catch effort in Cagayancillo, an improving level of understanding of the human impact on resources, and an increase in household income by 26% from 2004 to 2007 (Dygico et al. 2013). Furthermore, tourism has been growing and scientific knowledge was found to be distributed successfully to a wider audience through information, communication and education campaigns. The park's governance also received a very good rating, even though financial resources remained insufficient, with core activities such as enforcement, tourism management and TRNP administration still implemented through contributions from various partners.

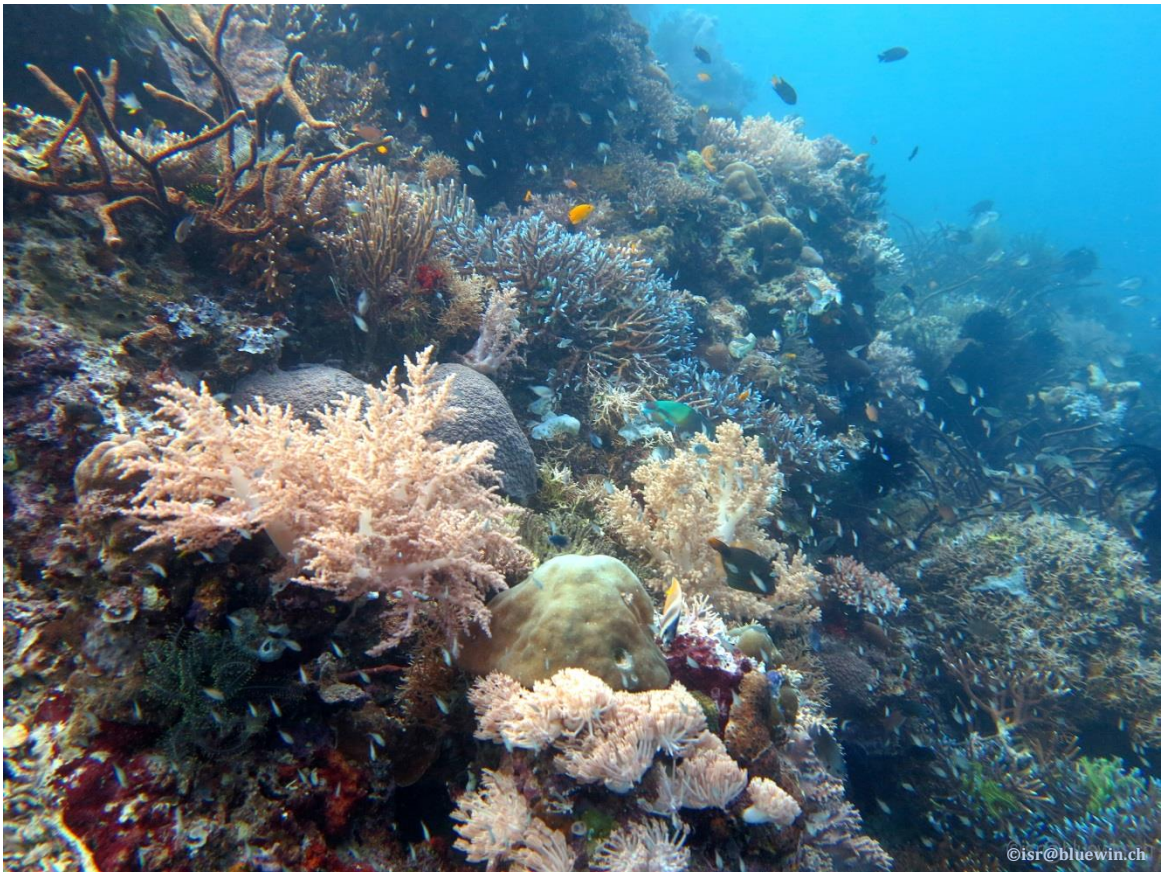
The application of a combination of governance incentives over the years of its existence has been crucial to the success story of TRNP. During the first decade, legal and knowledge incentives provided the main guidance in identification of the appropriate organisational structure to manage the park and establish jurisdiction over its boundaries. In addition, knowledge and interpretative incentives provided added value by generating credible information and a positive impact of management actions among communities and at national and international level. During the second decade, economic, interpretative and participative incentives were used increasingly to ensure that TRNP management benefited from tourism through user fees and that Cagayancillo Municipality received a fair share of benefits to partly compensate relinquished income opportunities (Dygico et al. 2013). The promotion of economically and ecologically sustainable resource exploitation has been encouraged through the Tubbataha Management Plan and has been implemented successfully through the close involvement of the local Cagayancillo community. To support the socio-economic needs of the residents, components on micro-finance, adventure-ecotourism, and information and education were made part of TRNP's Coastal Resource Management Program. In addition to the application of incentives, a clear enforcement protocol based on the legal mandate and conservation objectives of the TPAMB was formulated in association with the park's rangers; it is periodically reviewed and executed by a composite enforcement team comprising the Philippine Navy, Philippine Coast Guard, TMO and the Cagayancillo sea guards (Dygico et al. 2013). Finally, an effective judicial system and adequate enforcement equipment for fining illegal users is another important legal element, with criminal cases generally filed in the courts.

3.5 Solomon Islands

The Solomon Islands have prioritised the BSSME by declaring a transboundary partnership with Indonesia (Papua) and Papua New Guinea. The Solomon Islands LMMA was established to coordinate the management of marine resources, and a regional action plan was developed to provide guidance in the conservation of the endangered leatherback turtle in the BSSME (ADB, CTI-CFF, GEF 2014).

3.6 Timor Leste

Timor Leste is still in the process of establishing baseline data, key policies and legislation to support fisheries and protected area management in its marine regions. Promisingly, the implementation of an integrated coastal marine spatial plan for MPAs in Jaku Islands has been reported (ADB, CTI-CFF, GEF 2014).



4. References

ADB, CTI-CFF, GEF, 2014. Regional State of the Coral Triangle - Coral Triangle Marine Resources: Their Status, Economies, and Management. Asian Development Bank, Mandaluyong City, Philippines.

Agardy, T., Hicks, F. & Hooten, A., 2011. Evaluation of the Komodo Collaborative Management Initiative. International Financial Corporation and Global Environment Facility.

Campbell, S.J., Kartawijaya, T., Yulianto, I., Prasetia, R. & Clifton, J., 2013. Co-management approaches and incentives improve management effectiveness in the Karimunjawa National Park, Indonesia. *Marine Policy*, 41, 72–79.

Christie, P., 2004. Marine Protected Areas as Biological Successes and Social Failures in Southeast Asia. *American Fisheries Society Symposium*, 42, 155–164.

Christie, P. & Pollnac, R., 2011. Social dynamics of scaling-up marine protected areas declarations and management. In: Marine Protected Areas: A Multidisciplinary Approach. Cambridge: Cambridge University Press, 121–140.

Cinner, J.E. & Aswani, S., 2007. Integrating customary management into marine conservation. *Biological* Conservation, 140, 201–216.

Clifton, J., 2009. Science, funding and participation: key issues for marine protected area networks and the Coral Triangle Initiative. *Environmental Conservation*, 36(2), 91–96.

Clifton, J. & Majors, C., 2012. Culture, Conservation, and Conflict: Perspectives on Marine Protection Among the Bajau of Southeast Asia. *Society and Natural Resources*, 25(7), 716–725.

Clifton, J., 2013. Refocusing conservation through a cultural lens: Improving governance in the Wakatobi National Park, Indonesia. *Marine Policy*, 41, 80–86.

CTI-CFF & CTSP, 2011. Valuation Study of the proposed Tun Mustapha Park. Coral Triangle Initiative on Corals, Fisheries and Food Security (CTI-CFF), Malaysia.

CTI-CFF, 2013. Coral Triangle Marine Protected Area System Framework and Action Plan. CTI-CFF, United States Agency for International Development Coral Triangle Support Partnership and US National Oceanic and Atmospheric Administration, Cebu City, Philippines.

Dygico, M., Songco, A., White, A.T. & Green, S.J., 2013. Achieving MPA effectiveness through application of responsive governance incentives in the Tubbataha reefs. *Marine Policy*, 41, 87–94.

Fidelman, P., Evans, L., Fabinyi, M., Foale, S., Cinner, J. & Rosen, F., 2011. Governing large-scale marine commons: contextual challenges in the Coral Triangle. *Marine Policy*, 36(1), 42–53.

Glaser, M., Baitoningsih, W., Ferse, S.C.A., Neil, M. & Deswandi, R., 2010. Whose sustainability? Top-down participation and emergent rules in marine protected area management in Indonesia. *Marine Policy*, 34(6), 1215–1225.

Gleason, M., McCreary, S., Miller-Henson, M., Ugoretz, J., Fox, E., Merrifield, M., McClintock, W., Serpa, P. & Hoffman, K., 2010. Science-based and stakeholder-driven marine protected area network planning: A successful case study from north central California. *Ocean & Coastal Management*, 53(2), 52–68.

Green, A.L., Fernandes, L., Almany, G., Abesamis, R., McLeod, E., Aliño, P.M., White, A.T., Salm, R., Tanzer, J. & Pressey, R.L., 2014. Designing Marine Reserves for Fisheries Management, Biodiversity Conservation, and Climate Change Adaptation. *Coastal Management*, 42(2), 143–159.

Gunawan, B.I. & Visser, L.E., 2012. Permeable Boundaries: Outsiders and Access to Fishing Grounds in the Berau Marine Protected Area. *Anthropological Forum: A Journal of Social Anthropology and Comparative Sociology*. 22(2), 187–207.

Gustave, H. & Borchers, R., 2008. Conservation and conflict in Komodo National Park. In: Biodiversity and Human Livelihoods in Protected Areas - Case Studies from the Malay Archipelago. Cambridge: Cambridge University Press, 187–202.

Jones, P.J.S., Qiu, W. & De Santo, E.M., 2011. Governing Marine Protected Areas - Getting the Balance Right. Technical Report. United Nations Environment Programme.

Jones, P.J.S., 2013. A governance analysis of the Galápagos Marine Reserve. *Marine Policy*, 41, 65–71.

Jones, P.J.S., 2014. Governing Marine Protected Areas: resilience through diversity, Earthscan/ Routledge.

Kusumawati, R. & Visser, L.E., 2014. Collaboration or Contention? Decentralised Marine Governance in Berau. *Anthropological Forum*, 24(1), 21–46.

Majors, C., 2008. Seas of discontent: conflicting knowledge paradigms within Indonesia's marine environmental arena. In: Biodiversity and Human Livelihoods in Protected Areas: Case Studies from the Malay Archipelago. Cambridge: Cambridge University Press, 241–265.

Marinesque, S., Kaplan, D.M. & Rodwell, L.D., 2012. Global implementation of marine protected areas: Is the developing world being left behind? *Marine Policy*, 36(3), 727–737.

Mascia, M.B., Claus, C.A. & Naidoo, R., 2010. Impacts of Marine Protected Areas on Fishing Communities. *Conservation Biology*, 24(5), 1424–1429.

McClanahan, T.R., Marnane, M.J., Cinner, J.E. & Kiene, W.E., 2006. A comparison of Marine Protected Areas and Alternative Approaches to Coral-Reef Management. *Current Biology*, 16(14), 1408–1413.

McClanahan, T.R., Cinner, J.E., Maina, J., Graham, N.A.J., Daw, T.M., Stead, S.M., Wamukota, A., Brown, K., Ateweberhan, M., Venus, V. & Polunin, N.V.C., 2008. Conservation action in a changing climate. *Conservation Letters*, 1, 53–59.

McClanahan, T.R., 2012. Scaling the management values divide. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 22, 565–568.

Mora, C., 2011. Representativeness - Effectiveness of the global network of marine protected areas. In: Marine Protected Areas: A Multidisciplinary Approach. Cambridge: Cambridge University Press, 334–346.

Mora, C. & Sale, P., 2011. Ongoing global biodiversity loss and the need to move beyond protected areas: a review of the technical and practical shortcomings of protected areas on land and sea. *Marine Ecology Progress Series*, 434, 251–266.

Mous, P. J., Halim, A., Wiadnya, G. & Subijanto, J., 2004. Progress report on The Nature Conservancy's Komodo marine conservation project. TNC Southeast Asia Center for Marine Protected Areas, Bali, Indonesia.

Murray, B.S.N., Ambrose, R.E., Bohnsack, J.A., Botsford, L.W., Carr, H., Davis, G.E., Dayton, P.K., Gotshall, D., Gunderson, D.R., Hixon, M.A., Lubchenco, J., Mangel, M., Maccall, A., Mcardle, D.A., Ogden, J.C., Starr, R.M., Tegner, M.J. & Yoklavich, M.M., 1999. No-take Reserve Networks : Sustaining Fishery Populations and Marine Ecosystems. *Fisheries Management*. 24(11), 11–25.

Nordlund, L.M., Kloiber, Ul., Carter, E. & Riedmiller, S., 2013. Chumbe Island Coral Park - governance analysis. *Marine Policy*. 41, 110–117.

Olsson, P., Folke, C. & Hughes, T.P., 2008. Navigating the transition to ecosystem-based management of the Great Barrier Reef, Australia. *Proceedings of the National Academy of Sciences*, 105(28), 9489–9494.

Ostrom, E., 1998. A behavioral approach to the Rational Choice Theory of Collective Action. *American Political Schience Review*, 92(1), 1–22.

Pannell, S., 2013. Nature and culture in a global context: A case study from World Heritage Listed Komodo National Park, eastern Indonesia. In: Transcending the Culture-Nature Divide in Cultural Heritage: Views from the Asia-Pacific region. Terra Australis 36: ANU Press, 53–63.

Qiu, W., 2013. The Sanya Coral Reef National Marine Nature Reserve, China: A governance analysis. *Marine Policy*, 41, 50–56.

Saarman, E.T. & Carr, M.H., 2013. The California Marine Life Protection Act: A balance of top down and bottom up governance in MPA planning. *Marine Policy*, 41, 41–49.

Seixas, C.S. & Davy, B., 2008. Self-organization in integrated conservation and development initiatives. *International Journal of the Commons*, 2(1), 99–125.

Sharma, C. & Rajagopalan, R., 2013. Marine protected areas - Securing tenure rights of fishing communities. *Land Tenure Journal*, 1, 175–200.

Taylor, E., Baine, M., Killmer, A. & Howard, M., 2013. Seaflower marine protected area: Governance for sustainable development. *Marine Policy*, 41, 57–64.

UNEP, CBD & COP, 2012. Decisions Adopted by the Conference of the Parties to the Convention on Biological Diversity at its Eleventh Meeting. Hyderabad, India.

Walton, A., White, A.T., Tighe, S., Aliño, P.M., Laroya, L., Dermawan, A., Kasasiah, A., Hamid, S.A., Vave-Karamui, A., Genia, V., De Jesus Martins, L. & Green, A.L., 2014. Establishing a Functional Region-Wide Coral Triangle Marine Protected Area System. *Coastal Management*, 42(2), 107–127.

Weeks, R., Russ, G.R., Alcala, A.C. & White, A.T., 2009. Effectiveness of Marine Protected Areas in the Philippines for Biodiversity Conservation. *Conservation Biology*, 24(2), 531–540.

Worm, B., Hilborn, R., Baum, J.K., Branch, T.A., Collie, J.S., Costello, C., Fogarty, M.J., Fulton, E.A., Hutchings, J.A., Jennings, S., Jensen, O.P., Lotze, H.K., Mace, P.M., McClanahan, T.R., Minto, C., Palumbi, S.R., Parma, A.M., Ricard, D., Rosenberg, A.A., Watson, R. & Zeller, D., 2009. Rebuilding Global Fisheries. *Science*, 325(578), 578–585.

5. Further Reading

ADB, 2014. Economics of Fisheries and Aquaculture in the Coral Triangle, Mandaluyong City, Philippines.

Christie, P. & White, A.T., 2007. Best practices for improved governance of coral reef marine protected areas. *Coral Reefs*, 26(4), 1047–1056.

Elgin, D. & Weible, C., 2010. A Preliminary Political Feasibility Analysis of the Coral Triangle Initiative: A Short Report, unpublished.

Ferse, S.C.A., Máñez Costa, M., Schwerdtner Máñez, K., Adhuri, D.S. & Glaser, M., 2010. Allies, not aliens: increasing the role of local communities in marine protected area implementation. *Environmental Conservation*, 37, 1–12.

Fox, H.E., Holtzman, J.L., Haisfield, K.M., McNally, C.G., Cid, G.A., Mascia, M.B., Parks, J.E. & Pomeroy, R.S., 2014. How Are Our MPAs Doing? Challenges in Assessing Global Patterns in Marine Protected Area Performance. *Coastal Management*, 42(3), 207–226.

Gilles, M., 2012. Living and fishing in a marine protected area: balancing traditional fisheries with conservation in Karimunjawa National Park, Indonesia. Université de Montréal.

Global Ocean Commission, 2014. From Decline to Recovery - A Rescue Package for the Global Ocean. Summary Report, Oxford, UK.

Grantham, H.S., Agostini, V.N., Wilson, J., Mangubhai, S., Hidayat, N., Muljadi, A., Rotinsulu, C., Mongdong, M., Beck, M.W. & Possingham, H.P., 2013. A comparison of zoning analyses to inform the planning of a marine protected area network in Raja Ampat, Indonesia. *Marine Policy*, 38, 184–194.

Hamilton, R.J., Potuku, T. & Montambault, J.R., 2011. Community-based conservation results in the recovery of reef fish spawning aggregations in the Coral Triangle. *Biological Conservation*, 144(6), 1850–1858.

Higham James, L.M. ed., 2008. Marine Wildlife and Tourism Management: Insights from the Natural and Social Sciences, Pondicherry, India: CAB International.

Hill, N.A.O., Rowcliffe, J.M., Koldewey, H.J. & Milner-Gulland, E.J., 2011. The Interaction between Seaweed Farming as an Alternative Occupation and Fisher Numbers in the Central Philippines. *Conservation Biology*, 26(2), 324–334.

Horigue, V., Aliño, P.M., White, A.T. & Pressey, R.L., 2012. Marine protected area networks in the Philippines: Trends and challenges for establishment and governance. *Ocean & Coastal Management*, 64, 15–26.

Jones P.J.S., Qiu W. & De Santo, E.M., 2011. Governing Marine Protected Areas - Getting the Balance Right. Technical Report, United Nations Environment Programme.

Lam, M.E., 2012. Of Fish and Fishermen : Shifting Societal Baselines to Reduce Environmental Harm in Fisheries. *Ecology and Society*, 17(4), 18.

Maypa, A.P., White, A.T., Caňares, E., Martinez, R., Eisma-Osorio, R.L., Aliňo, P. & Apistar, D., 2012. Marine Protected Area Management Effectiveness: Progress and Lessons in the Philippines. *Coastal Management*, 40, 510–524.

McClanahan, T.R., 2011. Human and coral reef use interactions: From impacts to solutions? *Journal of Experimental Marine Biology and Ecology*, 408, 3–10.

McClanahan, T.R., Abunge, C.A. & Cinner, J.E., 2012. Heterogeneity in fishers' and managers' preferences towards management restrictions and benefits in Kenya. *Environmental Conservation*, 39(4), 357–369.

Mills, M., Pressey, R.L., Weeks, R., Foale, S. & Ban, N.C., 2010. A mismatch of scales: challenges in planning for implementation of marine protected areas in the Coral Triangle. *Conservation Letters*, 3, 291–303.

Muallil, R.N., Cleland, D. & Aliño, P.M., 2013. Socioeconomic factors associated with fishing pressure in small-scale fisheries along the West Philippine Sea biogeographic region. *Ocean & Coastal Management*, 82, 27–33.

Ostrom, E., 1999. Coping with Tragedies of the Common. *Annual Review of Political Science*, 2, 493–535.

Pascoe, S., Doshi, A., Thébaud, O., Thomas, C.R., Schuttenberg, H.Z., Heron, S.F., Setiasih, N., Tan, J.C.H., True, J., Wallmo, K., Loper, C. & Calgaro, E., 2014. Estimating the potential impact of entry fees for marine parks on dive tourism in South East Asia. *Marine Policy*, 47, 147–152.

Ping, H.S., 2006. Partners in Conservation? Communities, Contestation and Conflict in Komodo National Park Indonesia. National University of Singapore.

Pollnac, R., Christie, P., Cinner, J.E., Dalton, T., Daw, T.M., Forrester, G.E., Graham, N.A.J. & McClanahan, T.R., 2010. Marine reserves as linked social-ecological systems. *Proceedings of the National Academy of Sciences of the United States of America*, 107(43), 18262–18265.

Pomeroy, R.S., Parks, J.E. & Watson, L.M., 2004. How is your MPA doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness, Gland, Switzerland and Cambridge, UK: IUCN.

da Silva, P.P., 2004. From common property to co-management: lessons from Brazil's first maritime extractive reserve. *Marine Policy*, 28(5), 419–428.

Teh, L.S.L., Teh, L.C.L. & Sumaila, U.R., 2011. Quantifying the overlooked socio-economic contribution of small-scale fisheries in Sabah, Malaysia. *Fisheries Research*, 110, 450–458.

Van Trung Ho, T., Woodley, S., Cottrell, A. & Valentine, P., 2014. A multilevel analytical framework for more-effective governance in human-natural systems: A case study of marine protected areas in Vietnam. *Ocean & Coastal Management*, 90, 11–19.

White, A.T., Aliño, P.M., Cros, A., Fatan, N.A., Green, A.L., Teoh, S.J., Laroya, L., Peterson, N., Tan, A., Tighe, S., Venegas-Li, R., Walton, A. & Wen, W., 2014. Marine Protected Areas in the Coral Triangle: Progress, Issues, and Options. *Coastal Management*, 42(2), 87–106.

Wiadnya, D.G.R., Syafaat, R. Susilo, E. Setyohadi, D., Arifin, Z. & Wiryawan, B., 2011. Recent Development of Marine Protected Areas (MPAs) in Indonesia: Policies and Governance. *Journal of Applied Environmental and Biological Sciences*, 1(12), 608–613.

6. Lists of Web Links to MPA Programmes, Tools and NGOs

6.1. National and International Programmes Currently in Progress in the CT Region

www.atsea-program.org

The Arafura and Timor Seas (ATS) region is shared by Australia, Indonesia, Timor-Leste and Papua New Guinea. To manage its vast resources as well as overcome existing problems, Arafura and Timor Seas Expert Forum (ATSEF) was established with a clear objective to assist the stakeholders who depend upon the ATS in achieving the goals of sustainable development to support their livelihood. Between 2006 and 2007, ATSEF developed a bid for funding under the United National Global Environment Facility (GEF) known as the **Arafura and Timor Seas Ecosystem Action** (ATSEA) program. On May 14th 2010, the ATSEA program was officially started. ATSEA program is a manifestation of further effort at understanding and addressing existing problems at Arafura and Timor Seas by ATSEF, undertaking a Transboundary Diagnostic Analysis (TDA), development of a Strategic Action Programme (SAP), and implementation of innovative demonstration projects.

There are two national demo projects implemented in Indonesia, one in Maluku Tenggara Barat District and the other one in Aru Island District. ATSEA demo projects in Timor-Leste are located in Beacou, Bobonaro District, and implemented by the Ministry of Agriculture and Fisheries.

www.worldbank.org/projects/P127813/coral-reef-rehabilitation-management-program-phase-iii?lang=en

The objective of the **Coral Reef Rehabilitation and Management Program - Coral Triangle Initiative (COREMAP-CTI)** project for Indonesia is to institutionalise the COREMAP approach of a viable, decentralized and integrated framework for sustainable management of coral reef resources, associated eco-systems and bio-diversity for the welfare of the communities in seven selected districts of five provinces in the country.

The project consists of the following components:

- Institutional strengthening for decentralized coral reef management
- Development of ecosystem-based resources management
- Strengthening sustainable marine-based economy
- Project management, coordination and learning.

The project was approved in February 2014 and will be closed in June 2019.

www.coraltriangleinitiative.org

The Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) is a multilateral partnership formed by the governments of the six Coral Triangle countries in 2007 to address the growing threats to the Coral Triangle. Under the CTI-CFF, the six countries signed a declaration to protect the Coral Triangle and committed to implement a Regional Plan of Action (RPOA) with five main goals:

- Designation of effectively managed seascapes
- Application of an ecosystem approach to fisheries management
- Establishment of a fully functional marine protected area system
- Strengthening climate change adaptation and resilience
- Improving the status of threatened marine species.

CTI-CFF is managed through a Secretariat based in Jakarta, Indonesia. The CTI-CFF operates through a core decision-making and implementing bodies, including the CTI-CFF Council of

Ministers, the CTI-CFF Committee of Senior Officials, and the CTI-CFF National Coordinating Committees, all of which are supported by the CTI-CFF Regional Secretariat. Every year, the CTI-CFF Senior Officials gather to agree on a roadmap of priority regional activities that will be implemented in the coming year.

The following development and non-government organizations are listed as CTI-CFF partners who support the CTI-CFF Regional Secretariat and the CTI National Coordinating Committees in achieving the goals specified by the CTI Regional Plan of Action: The Coral Triangle Center (CTC), WWF, The Nature Conservancy (TNC), Conservation International (CI), The Global Environment Facility (GEF), The Asian Development Bank (ADB), The Australian Government, and The United States Agency for International Development.

The CTI-CFF has engaged the private sector through an annual CTI Regional Business Forum. The forum engages business and industry leaders in developing innovative solutions that are profitable and sustainable for the Coral Triangle region and promote new partnerships with the private sector, CTI member countries, NGOs, and international institutions to foster shared goals for sustainable marine resources. Apart from the forum, Development Partners and NGOs working to support the CTI-CFF have developed partnerships with businesses to support their programs and projects at the site level.

www.lmmanetwork.org

The **Locally-Managed Marine Area (LMMA) Network** is a group of practitioners involved in various community-based marine conservation projects around the globe, primarily in the Indo-Pacific, who have joined together to learn how to improve management efforts. The network is interested in learning under what conditions using an LMMA strategy works, doesn't work, and why. A Council, consisting of representatives from each country network, governs the overall network, while a Network Support Team (NST), consisting of a management unit, technical advisors, and country network coordinators, carries out the administration and implementation of activities.

www.mima.gov.my/mima/towards-sustainable-fishing-in-sulu-sulawesi-waters

The Sulu and Celebes Seas comprise the Sulu-Celebes Sea Large Marine Ecosystem (LME), an area of about 900,000 km^2. The expanse covered by these two seas, also called the **Sulu-Sulawesi Marine Ecoregion** (SSME), is partially divided by a chain of small islands known as the Sulu Archipelago. A large portion of the LME is located in the midst of three ASEAN nations – Indonesia, Malaysia and the Philippines. The multi-gear and multi-species fisheries of this marine ecoregion provide sustenance and livelihood to some 35 million people. Fishing in the area has been reported to be excessive and destructive, and has resulted to declining catches and reduced economic returns, changes in fish population structures, depleted coral reefs, and heightened threats to rare and endangered species. Conservation initiatives in the ecoregion have been taken up by the WWF and Conservation International (CI). Both NGOs have strategically mobilized the establishment of marine protected areas, accompanied by law enforcement support in priority conservation areas, otherwise known as marine biodiversity conservation corridors (MBCCs). As a result, networks of MPAs have been established, including the social network of MPAs in the Verde Island Passage Corridor and the network of Marine Turtle Protected Areas in the Sea Turtle Corridor.

The GiZ (Deutsche Gesellschaft für international Zusammenarbeit) supports the Implementation of the Tri-national Sulu-Sulawesi Marine Ecoregion (SSME) Comprehensive

Action Plan: In order to disseminate best practice in the SSME and CTI member states, the project provides intensive assistance in the organisation of workshops and the evaluation of experience with a goal to integrating this into local and national planning guidelines.

In recognition of the importance of the LME, Indonesia, Malaysia and the Philippines ratified the Sulu-Sulawesi Marine Ecoregion (SSME) Conservation Plan (ECP) in 2006 and subsequently formed the three-country governance structure – the Tri-national Committee for the SSME and its three Sub-Committees on Threatened, Charismatic and Migratory Species, Marine Protected Areas and Networks, and Sustainable Fisheries.

The Sulu-Sulawesi Fisheries Management Project (SS-SFMP) was developed with the support CI Philippines and the endorsement of the SSME Tri-national Committee. The Global Environment Facility (GEF) Council approved the SCS-SFMP in 2010, with the United Nations Development Programme (UNDP) as the Implementing Agency and the United Nations Office for Project Services (UNOPS) as the Executing Agency. The Department of Fisheries Sabah (DOFS) is the focal point for this project.

www.pewtrusts.org/en/projects/global-ocean-legacy

Pew Charitable Trusts' **Global Ocean Legacy** team is working with the President of Palau to create a large, fully protected marine reserve in these waters to safeguard this area for future generations. The reefs off this Micronesian island nation have been called one of the seven underwater wonders of the world. These attributes merit greater protection for the area.

Palau's president, Tommy Remengesau Jr., said in a speech in February 2014 to the United Nations that he plans to ban all commercial fishing from his nation's exclusive economic zone. This step could help transform much of the waters surrounding Palau into a fully protected marine sanctuary.

coralreef.noaa.gov

NOAA's Coral Reef Conservation Program (CRCP) is a cross-cutting program that brings together expertise from a wide array of NOAA programs and offices. The NOAA Coral Reef Conservation Program (CRCP) is a partnership between the NOAA Line Offices that work on coral reef issues: the National Ocean Service, the National Marine Fisheries Service, the Office of Oceanic and Atmospheric Research, and the National Environmental Satellite, Data and Information Service. The CRCP brings together expertise from across NOAA for a multidisciplinary approach to managing and understanding coral reef ecosystems. The CRCP funds and equips reef conservation activities by NOAA and its partners in the seven U.S. states and jurisdictions containing coral reefs (American Samoa, the Commonwealth of the Northern Mariana Islands, Florida, Guam, Hawai`i, Puerto Rico, and the U.S. Virgin Islands).

www.uscti.org

The **US Coral Triangle Initiative Support Program (US CTI)** − spearheaded by the US Agency for International Development's Regional Development Mission for Asia, in collaboration with USAID Indonesia, USAID Philippines, and USAID Timor-Leste − assists the CTI countries and the CTI regional secretariat to implement their regional and national plans of action through technical assistance and support capacity building, and access to cutting edge science. US CTI is implemented by:

a) The Coral Triangle Support Partnership (CTSP), a consortium of the World Wildlife Fund, Conservation International, and The Nature Conservancy, with teams in the CTI countries to implement activities that align with the national plans of action

b) The Program Integrator, based in Bangkok, Thailand, supporting program and partner coordination and providing technical assistance to CTI at the regional level
c) The National Oceanic and Atmospheric Administration, providing strategic technical assistance and training to support the CTI goals.

6.2 National and International Organisations Involved in the CT Region

bluesolutions.info

Blue Solutions work in close collaboration with national and regional marine and coastal biodiversity projects in developing countries all over the world. This organisation is funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) through its International Climate Initiative (ICI), and is coordinated by the Gesellschaft für Internationale Zusammenarbeit (GIZ) and implemented in partnership with the Norwegian foundation and UNEP Collaborating Centre GRID-Arendal, the International Union for Conservation of Nature (IUCN) and the Freshwater and Marine Ecosystems Branch of the United Nations Environment Programme (UNEP).

Blue Solutions work in the marine and coastal realm on the topics Coastal & Marine Management, Protected Areas, Integrating Ecosystem Services, Climate Change, and Sustainable Financing. Projects are being supported in the Philippines, Indonesia and Papua New Guinea.

www.crc.uri.edu

The **Coastal Resources Center** (CRC) at the Graduate School of Oceanography, University of Rhode Island, is active in countries throughout the world promoting the sustainable use of coastal resources for the benefit of all. Implementing coastal management projects in the field, building capacity through education and training, and sharing lessons learned and information throughout the coastal community are the foundation of the CRC's work.

In North Sulawesi, Indonesia, CRC and its partners introduced one of the first models for a network of community-based MPAs. In the Philippines, CRC's research and assessments of the effectiveness of MPAs has identified factors that most influence community-based MPA success or failure.

www.conservation.org/what/pages/oceans.aspx

Conservation International (CI) is working to protect the coral reefs and mangroves in Bird's Head Seascape, West Papua. CI helped design a network of 15 MPAs, covering over 3.6 million ha, that put into place effective fisheries regulations and enforcement systems. Additionally, CI and partners are working to empower and enable local communities to strengthen their rights and their capacity to manage marine resources within their own unique cultural context. CI worked with indigenous communities to design an MPA management system that legally strengthens traditional land and sea ownership rights (tenure) and reinvigorates important cultural practices. And lastly, CI and partners are working with local governments to strengthen local economies by focusing on sustainable ecotourism. For example, CI worked with the Raja Ampat government to establish a shark and ray sanctuary and to promote the region as a world-class marine tourism destination. CI also designed and implemented an innovative tourism user fee system to ensure benefits transfer directly to communities and support conservation efforts.

coral.org

Coral Reef Alliance (CORAL) takes a multi-pronged approach to restoring and protecting coral reefs in partnership with the communities living nearest the reefs. The strategies include:

- Reducing local threats to reefs, including overfishing, poor water quality, and unsustainable development
- Helping communities benefit socially, culturally, and economically from conservation

- Improving reef management so those responsible for the creation, enforcement, and durability of protected areas have the tools and financial support they need to be successful
- Working directly with the tourism industry to decrease its environmental footprint and to educate visitors about the beauty and importance of coral reefs
- Ensuring that knowledge gained from project sites has a global impact.

Current projects sites are located in Fiji, Honduras, Hawaii, Indonesia, and Mexico, with a research project in Palmyra.

coraltrianglecenter.org

The Coral Triangle Center (CTC) is an independent nonprofit foundation, based in Indonesia. Founded originally as a program of The Nature Conservancy in 2000, the CTC was launched as an independent entity to respond to the huge growth in demand for training and learning services and the need for an autonomous locally based organization. Under Indonesian Law, nonprofits ensure an appropriate separation of powers and responsibilities through four types of board designations: Trustees, Founders, Supervisors, and Management. In addition, given that the CTC is committed to serving the full Coral Triangle region, which includes Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor-Leste, the CTC has an Advisory Board to assist with regional outreach.

CTC recognizes the importance of developing MPA as a site that serves as living laboratories to observe, learn and study from the field experience relating to marine conservation and MPA establishment, and resource management. CTC has incorporated this into its main strategies and formulated the following objectives:

- To deepen our understanding and practices concerning marine resources management by collaborating directly on a small number of sites, field testing solutions to pressing regional problems
- To document effective management practices and developing living laboratories for learning and training programs in the Coral Triangle demonstration sites to leverage practical ideas region wide.

The two CTC learning sites are Nusa Penida MPA and Banda Islands MPA Network.

www.ecoflores.org

The **Eco Flores** Foundation initiates and facilitates collaborations and partnerships in efforts for the sustainable development of Flores. Various local and international NGOs, government affiliations, universities, business networks (one of which is the UN Global Compact), and private enterprises are involved in projects on fisheries, ecotourism, waste management, etc. In marine management and conservation, Eco Flores is connected to the Locally-Managed Marine Area (LMMA) Network (www.lmmanetwork.org).

www.thegef.org/gef/CTI

The **Global Environment Facility** (GEF) is a partnership for international cooperation where 183 countries work together with international institutions, civil society organizations and the private sector, to address global environmental issues. The United Nations Development Programme, the United Nations Environment Program, and the World Bank were the three initial partners implementing GEF projects after its establishment in 1991. GEF is the largest contributor of funds to the CTI. To support the Initiative, the GEF Council endorsed, in April 2008, a program of $63 million that covers biodiversity, international waters, and adaptation to climate change activities. The

program has also been able to catalyze more than $300 million of co-financing for CTI to conserve tuna and coral ecosystems while alleviating poverty.

The planning of the GEF CTI program was led by the countries and it was accompanied by the Asian Development Bank, the coordinating agency, and four other GEF agencies: FAO, UNDP, UNEP and the World Bank. A year later, the 76% ($45.5 million) of the funds have already been allocated for the implementation of nine projects in the six participating countries. The following are some of the projects that are currently under implementation:

- Strengthening marine and coastal resource management in the Coral Triangle of the Pacific, ADB implementing agency, started in March 2009
- Strategies for Fisheries Bycatch Management, a regional project implemented by FAO and included in the April 2009 GEF Work Program
- Philippines CTI Integrated Natural Resources and Environmental Management project implemented by ADB and approved by the GEF Council in June 2009.

www.mima.gov.my

The **Maritime Institute of Malaysia (MIMA)** – formerly known as Malaysian Institute of Maritime Affairs – is a policy research institute set up by the Malaysian Government to look into matters relating to Malaysia's interest at sea, and to serve as a national focal point for research in the maritime sector. The MIMA has the mission to provide maritime-related advice and consultancy services to stakeholders through policy research, training, education and public awareness programmes.

www.nature.org/ourinitiatives/regions/asiaandthepacific/coraltriangle/index.htm

The Nature Conservancy (TNC) has fisheries and marine conservation programs around the globe in important seascapes including marine projects in every coastal state and territory of the U.S. TNC focuses on the need for improved overall governance, policies and management of oceans at all scales, from individual sites, to regional, national and multinational levels balancing development and conservation needs. TNC works with fishermen, industry, governments, and academics to design and implement fisheries management approaches that promote stable supplies of seafood, secure livelihoods for fishing communities and marine conservation. TNC also aims at improving the resilience of vulnerable coastal communities by providing tools for hazard managers, engineers, and elected officials to develop long-range plans for coastlines and identify solutions for risk reduction. Furthermore, TNC and partners protect and restore corals, mangroves, oyster reefs, seagrasses and other natural habitats that dampen wave energy during storms, support local economies and offer areas for fish and other marine life to thrive.

In Asian and Pacific regions, TNC is engaged in projects in Indonesia, Papua New Guinea and the Solomon Islands.

opwalltrust.org

The **Opwall Trust** funds projects that empower communities and individuals to develop successful commercially viable enterprises linked to the conservation of biodiversity. The Opwall Trust is a UK registered charity, created in 2000 to provide the focus for funding conservation management interventions at a sister organisation's study sites (Operation Wallacea) in 14 countries.

By 2009, Indonesia had become the world's largest producer of 'cottonii' (*Kappaphycus alvarezii*) seaweed, with national production of dry raw material exceeding 85,000 MT (metric tonnes). Seaweed farmers are amongst the poorest members of Indonesian coastal communities,

leading many individuals to fish from nearby coral reefs as a source of subsistence or to supplement their small income. Based on the 2009 value of dried seaweed, this represented on paper an annual value of approximately US$100 million to the Indonesian economy. Despite Indonesia dominating raw material production, value added processing remains almost exclusively within the Philippines, where they process 87% of Indonesia's seaweed production. With the high value of processed carrageenan, this represents a significant and largely unnecessary loss to the Indonesian economy, which has already been highlighted by the Indonesian Government as a key priority for future economic growth. The Opwall Trust has been working in Indonesia for over 15 years, and for the past decade has been developing a best practice model for Indonesian coastal fisheries management in the Wakatobi Marine National Park. However, the age old barrier to conservation success remained: the development and implementation of alternative income streams. After investigating the potential for ecotourism, aquaculture and coral farming, the most likely source of sufficient success was in the form of seaweed farming.

www.rare.org

In the past 25 years, **RARE** has launched more than 250 conservation campaigns in over 50 countries addressing issues such as overfishing, illegal poaching and deforestation. RARE trains local conservation leaders all over the world to change the way their communities relate to nature. Its signature method is called a 'pride campaign' – so named because it inspires people to take pride in the species and habitats that make their community unique, while also introducing practical alternatives to environmentally destructive practices. RARE and its partners have engaged dozens of local fishing communities throughout Indonesia, Malaysia and the Philippines to support sustainable fishery management and to ensure long-term benefits for people by creating and enforcing fishery replenishment zones (MPAs).

www.unep-wcmc.org

The **United Nations Environment Programme** (UNEP) promotes the use of sound science to apply ecosystem management to address factors causing decline of ecosystem services in marine and coastal areas. Under the Medium Term Strategy of UNEP, the UNEP Marine and Coastal Strategy has been developed by the UNEP Marine and Coastal Ecosystems Branch (MCEB) to focus on priority issues for maintaining marine ecosystems and their services for human well-being. MCEB provides a comprehensive institutional and programmatic framework for regional and global cooperation for the protection of the marine environment. It hosts the Marine Ecosystems Unit (MEU), the Global Programme of Action for the Protection of the Marine Environment from Land based Activities (GPA), and the Regional Seas Programme (RSP).

In Asian and Pacific regions, UNEP's work in marine conservation includes The East Asian Seas Action Plan, Green Fins Programme, and the Tigum Aganan catchment area in the Philippines.

www.unglobalcompact.org

The **UN Global Compact** is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption.

www.worldbank.org

The **World Bank Group** has set two goals for the world to achieve by 2030: to end extreme poverty by decreasing the percentage of people living on less than $1.25 a day to no more than 3%, and to promote shared prosperity by fostering the income growth of the bottom 40% for every country. The

World Bank is a vital source of financial and technical assistance to developing countries around the world. Globally, it is the largest international financier of education, biodiversity, water supply and sanitation projects. The Group comprises five institutions managed by their member countries: The International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA), and the International Centre for Settlement of Investment Disputes (ICSID).

www.wcs.org/saving-wild-places/ocean.aspx

The **Wildlife Conservation Society (WCS)** is investing in ocean protection, sustainable fisheries, and marine species conservation across the waters of 23 countries and all five oceans. With several hundred marine scientists and conservationists on staff, WCS tests and applies innovative solutions for measurable conservation outcomes, focusing on protection of key habitats, ending coastal overfishing, and saving marine mammals, sharks and rays. Within the Coral Triangle, WCS supports the Karimunjawa Seascape, the North Sulawesi-Halmahera and the Weh Island/Aceh in Indonesia, as well as the New Ireland Seascape of Papua New Guinea.

worldwildlife.org/places/coral-triangle

The **World Wildlife Fund (WWF)** works with communities all over the the Coral Triangle to create sustainable reef fisheries, to improve livelihoods, and to understand and plan for climate change impacts.

- **WWF-Indonesia** is active in Sumatera (Nangroe Aceh Darussalam, Tesso Nilo in Riau, Bukit Barisan Selatan in Lampung), Jawa (Ujung Kulon in Banten), Sulawesi (Bunaken Project in North Sulawesi, Wakatobi in South East Sulawesi, Kendari - M3 Campaign in South East Sulawesi), Kalimantan (Betung Kerihun in West Kalimantan, Kayan Mentarang, Derawan in East Kalimantan, Sebangau in Central Kalimantan, HoB - Heart of Borneo), Nusa Tenggara (Riung and Gunung Rinjani in West Nusa Tenggara, Alor-Solor in East Nusa Tenggara, Mutis Timau in West Timor, Sumbawa), and Papua (Lorentz National Park, Jamursbamedi, TN Cendrawasih Bay).
- The marine conservation programme of **WWF-Malaysia** comprises the Peninsular Malaysia Seas Programme and the Sulu-Sulawesi Marine Ecoregion (SSME) Programme.
- WWF-Philippines has project sites in Laguna (Santa Rosa), Isabela (Abuan Watershed), Batangas (Hamilo Coast), Sorsogon (Donsol), Occidental Mindoro (Sablayan and Apo Reef, Mamburao), Palawan (Taytay & Araceli, Quezon, Tubbataha Reefs and Cagayancillo), Davao (IGACOS), Lagonoy Gulf, Sulu (Tawi-Tawi).

6.3 Up-to-date MPA Governance programmes and tools

ctatlas.reefbase.org

The **Coral Triangle Atlas (CT Atlas)** is an online GIS database, providing governments, NGOs and researchers with a view of spatial data at the regional scale. Data on fisheries, biodiversity, natural resources, and socioeconomics which have been collected for decades by scientists and managers working in different parts of the Coral Triangle region are available for everyone to use.

www.ebmtools.org → smartgrowthtools.org/ebmtools/index.php

The **Ecosystem-Based Management (EBM) Tools Network**, coordinated by NatureServe (a public-private network of independent organisations operating across the United States) as part of its 'Coastal and Marine Strategy', is one of the premier sources of information about coastal and marine planning and management tools in the United States and internationally. The EBM Tools Network is currently focusing on tools for:

- Climate change vulnerability assessment and adaptation planning
- Ecosystem-based coastal and marine spatial planning
- Integrated land-sea planning to minimize the impacts of land use on coastal and marine environments.

www.impac3.org

Every four years, the **International Marine Protected Areas Congress (IMPAC)** brings together major maritime stakeholders from around the globe, beyond national or sectoral boundaries, to assist in the conservation and sustainable development of the oceans. Participants represent public management and planning agencies, research institutions, non-governmental organizations, coastal or island communities, and sea-related industries, from fishing to cable laying, mining, shipping and tourism.

In 2013, the Agence des aires marines protégées (French Marine Protected Areas Agency) and the International Union for Conservation of Nature (IUCN) were co-organizing the 3rd edition of the International Marine Protected Areas Congress (IMPAC3). IMPAC3 gives national and international administrations a chance to report back on their work, so that participants may draw intermediate lessons from initiatives already underway, and improve current and future programs:

- Exchange MPA planning and management expertise and know-how
- Develop cooperation and capacity building among MPAs
- Promote global and regional networking
- Use the web to connect stakeholders
- Integrate MPAs with the rising Blue Economy
- Foster public interest in MPAs and contribute to the emergence of a Blue Society

IMPAC3 aims to deliver a new vision and new tools to achieve the goal of protecting 10% of the world's oceans by 2020.

www.iucn.org/about/work/programmes/marine/marine_our_work/marine_mpas

The **IUCN Global Marine and Polar Programme (GMPP)** is a team of staff committed to effectively addressing key global challenges in the marine and polar environment. GMPP cooperates with other IUCN thematic and regional programmes and with the IUCN Commissions to ensure that marine and polar ecosystems are maintained and restored in their biodiversity and productivity, and that any use of the resources is sustainable and equitable.

GMPP's work is carried out by a 25-strong team of marine professionals in 10 countries working at various levels. From local fishermen and decision-makers right up to the United Nations General Assembly, the GMPP also works in partnership with a variety of corporations from the private sector on themes such as tourism, offshore renewable energy and minimizing the environmental impacts from coastal oil and gas operations. Additionally, the GMP works with several Commissions, including the World Commission on Protected Areas (WCPA) – Marine Division, the Species Survival Commissions (SSC) – Specialists Groups, the Marine Conservation sub-committee, and the Commission on Environmental Law (CEL) – Oceans Law and Governance Specialists Group.

www.mpaglobal.org

MPA Global is a work-in-progress database of the world's Marine Protected Areas, and a collaborative project between the University of British Columbia Fisheries Centre - Sea Around Us Project, the World Wildlife Fund (WWF), the United Nations Environment Programme - World Conservation Monitoring Centre (UNEP-WCMC), and the International Conservation Union - World Commission on Protected Areas (IUCN-WCPA).

www.mpag.info

Marine Protected Area Governance (MPAG)

A group of governance experts, led by Dr. Peter J. S. Jones (Dept. of Geography, University College London), and MPA planners and managers has been initiated to analyse MPA case studies and develop guidance on governing MPAs in seas under national jurisdiction. 20 MPA case study from around the world have been brought together in the preliminary phase and subjected to detailed analysis employing a new governance analysis framework, 'deconstructing' the complexities of MPA governance employing 33 incentives from five categories.

mpatlas.org

The Marine Conservation Institute, in partnership with the Waitt Foundation, has developed the **MPAtlas**, an online digital atlas that assembles key information on marine protected areas (MPAs) around the world. The aim is to provide governments, organizations, and individuals with a clearer picture of local and global MPAs.

coralreef.noaa.gov

NOAA's (US Dept. of Commerce, National Oceanic and Atmospheric Administration) **Coral Reef Conservation Program (CRCP)** is a cross-cutting program that brings together expertise from a wide array of NOAA programs and offices. In strong partnership with coral reef managers, the CRCP works to reduce harm to, and restore the health of, coral reefs, including deep-water corals, by addressing priority national threats and local management priorities through conservation activities. The program provides coral reef managers, scientists, and other users worldwide with information and forecasts of coral bleaching events using sea surface temperature data from satellites.

CRCP funds and equips reef conservation activities by NOAA and its partners in the seven U.S. states and jurisdictions containing coral reefs (American Samoa, the Commonwealth of the Northern Mariana Islands, Florida, Guam, Hawai`i, Puerto Rico, and the US Virgin Islands), uninhabited islands including the Northwestern Hawaiian Islands and Pacific Remote Island Areas, and internationally, including the Pacific Freely Associated States.

oceana.org

Oceana, founded in 2001, is the largest international organization focused solely on ocean conservation, protecting marine ecosystems and endangered species. Offices in Europe, North America, Central America and South America work together with teams of scientists, economists, lawyers and advocates on a limited number of strategic, directed campaigns to achieve tangible results for the oceans.

www.piscoweb.org

The **Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)** is a long-term ecosystem research and monitoring program established with the goals of:

- Understanding dynamics of the coastal ocean ecosystem along the U.S. west coast
- Sharing that knowledge so ocean managers and policy makers can take science-based decisions regarding coastal and marine stewardship
- Producing a new generation of scientists trained in interdisciplinary collaborative approaches.

Established in 1999 with funding from The David and Lucile Packard Foundation, PISCO is led by scientists from core campuses Oregon State University (OSU); Stanford University's Hopkins Marine Station; University of California, Santa Cruz (UCSC); and University of California, Santa Barbara (UCSB). Collaborators from other institutions also contribute to leadership and development of PISCO programs.