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Lessons learned and good practices in the management of coral reef marine protected areas

KEY LESSONS LEARNED

This brief presents a review of lessons learned and good practices in the management of coral reef marine protected areas based on the analysis of 20 projects funded by the Global Environment Facility (GEF) related to coral reef MPAs and 21 non-GEF funded projects. The key lessons learned and recommendations are grouped according to four broad areas of management of coral reef marine protected areas:

- Ecological objectives and impacts
- Economic objectives and impacts
- Socio-cultural objectives and impacts
- Governance issues

INTRODUCTION

The objective of this project is to formalize the experiences, outcomes and lessons learned from previous GEF projects, as well as major non-GEF initiatives involving marine protected areas (MPAs) in coral reefs and associated ecosystems. The project aims to comprehensively identify, analyze, and translate lessons into good practices and information resources, and then disseminate this information globally for use in future project design and development. Based on its history of supporting coral reef biodiversity, management and sustainable development, this project will help the GEF fulfill a major mandate to identify what has worked and what could be improved upon in supporting biodiversity conservation. In combination with other GEF projects, this effort will also help the GEF and other major non-GEF projects achieve a markedly improved return on investment for future projects involving coral reefs MPAs.

Since the 1990s, over \$320 million of GEF funds were invested in projects at varying action and technical levels to improve the management of coral reef, seagrass and mangrove habitats, much of which was part of a broader portfolio of over \$600

million invested in coastal-marine projects overall. During four entry periods each year, the GEF receives well over 200 concepts and project proposals annually. Even though the actual number of pipeline-approved projects is much less, the volume and diversity of those projects approved has far exceeded the Secretariat's ability to review and assess those elements that have worked and what could be improved upon.

The dissemination of good practices based on lessons learned is a strategic priority for the GEF. However, in the case of coral reef projects no comprehensive understanding of GEF successes and failures has ever been conducted. In recent reviews of GEF performance and activities, the need to utilise the results of previous project outcomes, experiences and lessons learned more comprehensively has been highlighted. Earlier works exist that extract lessons learned from previous projects, looking at both success and failure and comparing across global regions; however, such work has been neither comprehensive nor systematic.

Methods

This project initially sought to review all GEF-funded projects related to coral reefs and associated tropical marine ecosystems (65 projects in total) and about 10-20 key non-GEF funded projects. However, review of the GEF projects indicated that only 20 GEF projects had sufficient focus on coral reef MPAs, were either completed or far enough along to have gathered lessons learned information, or had sufficient available documentation. Many of the others were too recent to have gathered useful information, while several had been cancelled due to implementation problems.

In order to gather more useful information, we examined 50 non-GEF funded projects, based on a variety of criteria. Of these, 21 projects had sufficient lessons learned information to warrant including in our analysis. In addition to reviewing project documentation (progress reports, final reports), primary literature was consulted where these publications arose directly from the projects reviewed. In addition, personal interviews of project personnel were conducted. From our review of coral reef MPAs, we identified good practices in four broad areas of MPA management:

1. Ecological objectives and impacts;
2. Socio-cultural objectives and impacts;
3. Economic objectives and impacts;
4. Governance issues.

ISSUE 1: Ecological Objectives and Impacts

The primary ecological objectives of MPAs are to conserve biodiversity and to enhance fishery yields where other forms of fishery management do not work (as may often be the case in developing coastal nations with low institutional capacity for management). In the past, MPAs have typically been small no-take areas ("marine reserves") often implemented at sites with particularly healthy coral reef habitat. Management of these marine reserves involves a ban on harvesting but rarely any regulation of activities occurring outside the reserve (e.g. upland deforestation, road building, etc.). Currently, managers are moving to a paradigm of larger MPA networks implemented within a "ridge to reef" approach to ecosystem-based management, where MPAs, watershed management, and wise land-use practices are included in an integrated coastal management regime.

Key lessons learned and recommendations

- Address management of coral reef MPAs through integrated and holistic management of related ecosystems and land uses. Address all ecosystem components and processes to maintain the full range of ecological interactions, and to aim for resilience rather than for desired end-points.

- Implement management at ecologically relevant scales such as watersheds, monitoring the status and trends of systems over long time periods and incorporate marine protected areas into management frameworks.
- Integrate issues of sedimentation and sediment re-suspension into coastal reef protection, or further declines in resources will continue to occur. MPAs should be part of an integrated "ridge to reef" management plan that includes wise land use practices and watershed management.
- Provide fishing communities with accurate and realistic predictions of MPA benefits; avoid "overselling" MPAs on the basis that increased catches due to spillover and enhanced recruitment from spawning in the MPA will more than make up for lost fishing grounds, increased effort and higher costs of fishers displaced from the MPA.
- Obtain comprehensive biological and biophysical datasets before designing MPA networks. Where possible, conduct research to determine critical spawning and nursery habitats, connectivity pathways, and resilience of habitats, ecosystems, and livelihoods.
- Incorporate a range of fishery management tools and avoid reliance on MPAs only. Other methods of restricting catch and/or effort are valuable, do not displace fishers, and may cause fewer conflicts between fishers and other reef resource users.
- Monitor marine resources and ecosystem health within MPAs. Without monitoring, you can evaluate neither the success nor cost effectiveness of MPAs, nor carry out adaptive management if needed.
- Set up and monitor a few comparable "control" areas where no regulations or conservation activities are in place. These provide a clear baseline against which you can evaluate the cost-effectiveness of your MPA.

ISSUE 2: Socio-cultural Objectives and Impacts

MPA managers generally agree that most challenges to MPA implementation are social. Reef-dependent communities need to be resilient and coexist with the ecosystem, not suffer from bad practices. This "social resilience" is the ability of the community to deal with change, through learning, reorganizing, self-organizing, and combining knowledge. It is crucial to recognize the diversity of communities and be flexible. Thus MPAs need adaptive management and monitoring to evaluate the effectiveness of their management in meeting community goals.

Key lessons learned and recommendations

- Design MPAs to meet community goals and achieve greater compliance and subsequent conservation success.

- Collect and integrate indigenous knowledge to avoid conflicts in zoning.
- Use GIS and participatory mapping tools for zoning and rationalising roles and responsibilities among government organisations and other stakeholders.
- Educate people about the zone boundaries and permitted uses, alongside training in ways to reduce human threats.
- Base local MPA management plans on locally perceived threats/issues and sound data on local resource status.
- Focus MPA management on the socio-cultural conditions and needs of communities. Incorporate formal workshops, participatory training exercises and community development to build trust and achieve stewardship of the MPA planning process.
- Translate the goals and objectives of the MPA such that they are understandable to the target audiences and the community context.
- Create a forum for stakeholder interaction, query, and debate to provide opportunities for collaboration and mediation within the context of social interactions and conflicts.
- Involve marginalised user groups (gender and ethnic equality) and functional community leaders to promote good will, improve project management, and ensure equitable distribution of benefits.
- While permanent reserves are more effective, rotational or seasonal closures or regulations other than complete closures are often more accepted, have less immediate social impacts and are easier to monitor and enforce.

ISSUE 3: Economic Objectives and Impacts

In order for MPAs to be sustainable, management must contribute to economic returns and livelihood. Reef-dependent communities that do not see any sign of increased economic returns from their MPA are unlikely to continue to support it. MPAs are often “oversold” on the promise of higher fishery yields through increased spawning biomass and spillover. However, the value of this increased production is difficult at best to quantify at the time of implementation.

Key lessons learned and recommendations

- Clearly identify and communicate economic and other benefits of MPAs to maintain stakeholder interests and manage expectations.
- Evaluate costs and benefits of private sector involvement early in the MPA development to assure buy-in and long-term engagement.

- MPAs will have higher compliance and be more effective at conserving resources if they are easily visible to the community, and compliance is likely to increase the longer the MPA remains enforced.
- MPAs will be more effective if implemented in communities with less market influences (i.e., proportion of fish sold or bartered and involvement in formal economic activities such as teaching, government employment, and other salaried positions), lower population sizes, and less wealth.
- Where fishers or other resource users are likely to be displaced, provide realistic, long-term options for alternative livelihoods (e.g. ecotourism, catch-and-release sport fishing, seaweed farming, etc.).

ISSUE 4: Governance of MPAs

Governance of MPAs includes a wide array of policies, strategies, institutional arrangements, legislation, information and education, financing mechanisms and capacity development. It involves the delineation of the roles and responsibilities of the various agencies and stakeholder groups involved in management.

Key lessons learned and recommendations

- Explore bottom-up and co-management approaches, recognising that varying management structures and strategies improves MPA effectiveness.
- MPA regulations need to be pragmatic and address root causes but not be unrealistic in the ability of people to change their behaviour.
- Zoning requires knowledge gained through a participatory process and that is well integrated with tools such as participatory mapping and GIS.
- Policies that include more than one jurisdiction will require time to integrate and may often need to be agreed on prior to implementation.
- Rapid and fair enforcement is essential to achieve continued support, faith, and compliance in MPA management.

CONCLUSIONS AND FUTURE DIRECTIONS

Coral reefs have received much attention lately as the areas of highest marine biodiversity and are among the world’s top conservation priorities. Hundreds of millions of people and thousands of communities all over the world depend on coral reefs for food, protection, and jobs. For example, over 150 million people live within the ‘Coral Triangle’ of Southeast Asia and Melanesia, of which over 2,600,000 are fishers who are dependant on marine resources for their livelihoods. Over the

past 15 years, over one billion dollars have been spent on coral reef management projects worldwide (\$320 million from the GEF alone).

One new concept that has been introduced in the past decade is 'resilience'. The central concept of 'resilience' may be defined as "the capacity of a complex system to absorb shocks while still maintaining function, and to reorganize following disturbance". To date, concepts of resilience have generally been applied only to corals, in terms of their resilience to climate change, sedimentation, pollution, etc. In the context of coral reefs, "management for resilience" should prevent a coral reef system from failing to deliver benefits (i.e. biodiversity conservation, ecosystem function, food and income for poverty reduction) by preserving ecological and social features that enable it to absorb shocks (climate change, natural disasters, user conflicts, etc.) and maintain function.

Another key area for future research is identifying and mapping critical spawning and nursery habitats for a range of ecologically

and commercially important species. Also important is a better understanding of the connectivity between spawning (source) and nursery (sink) habitats. This information is essential to designing effective MPA networks. Connectivity is also important in transboundary management, where MPAs or networks of MPAs span more than one jurisdiction.

Current MPA management practice does not place sufficient emphasis on threats that arise from outside the reef area. Climate change will have a profound affect on coral reefs and the coral reef resource (fishery) dependent peoples that live there. Any approach to biodiversity conservation and development must account for these impacts. In a development (i.e. poverty reduction) context, climate change must be viewed as a fundamental threat to human security in countries already vulnerable to social and economic dislocation and conflict.

WorldFish Lessons Learned briefs are executive summaries of research projects with particular focus on lessons learned. These briefs play a role in knowledge management and sharing.



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This project has been funded by the Global Environment Facility (GEF) and the United Nations Environment Programme (UNEP),



and is carried out in partnership with International Waters Learning Exchange and Resource Network (IW:Learn), The Nature Conservancy (TNC), World Wildlife Fund (WWF), Conservation International (CI), Reef Check, International Coral Reef Action Network (ICRAN), Global Coral Reef Monitoring Network (GCRMN), National Oceanic and Atmospheric Administration (NOAA).



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Supported by the CGIAR