



LESSONS LEARNED | 1804

## Lessons learned and best practices in the management of coral reefs

### KEY LESSONS LEARNED

This brief presents a review of lessons learned and best practices in the management of coral reefs based on the analysis of 30 projects funded by the Global Environment Facility (GEF) related to coral reefs and associated tropical marine ecosystems and 26 non-GEF funded projects. The key lessons learned and recommendations are grouped according to eight priority issues in coral reef management:

- Project design
- Project management
- Community participation
- Partnerships and linkages
- Policy, legislation and enforcement
- Ecosystem-based management
- Monitoring and evaluation of coral reef management
- Capacity, education and knowledge management

### 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 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 an improved return on investment for future projects involving coral reefs and associated ecosystems.

Since the 1990s, over \$320 million of GEF funds have been invested in projects at varying action and technical levels to improve the management of coral reef, seagrass and mangrove habitats. Much of this 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. While the actual number of pipeline-approved projects is much less, the volume and diversity of those projects approved has strained the capacity of the GEF to review

and assess those elements that have worked and to identify what could be improved upon.

The dissemination of best 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 previously been conducted**. In recent reviews of GEF performance and activities, the need to utilize the results of previous project outcomes, experiences and lessons learned more comprehensively has been highlighted. While some earlier work has extracted lessons learned from specific projects, looking at both success and failure and comparing across global regions, a comprehensive and systematic analysis has not been attempted.

### **Context of this project in relation to other coral reef management initiatives**

To a considerable extent the projects covered in this review can be seen as responses to the Call to Action and framework for Action adopted by the International Coral Reef Initiative in 1995. The lessons learned reflect the continuing need for more and more effective action to address the four main themes of the ICRI Call to Action:

1. Integrated Coastal Zone Management;
2. Building capacity to manage;
3. Research and Monitoring;
4. Review or performance evaluation of the effectiveness of management.

This report may be seen as part of the broader review or performance evaluation of lessons learned in projects implementing the ICRI Call to Action. Evaluations of projects and lessons within and beyond the GEF portfolio include those identified in workshops of the International Tropical Marine Ecosystems Management Symposia.

UNEP (2004) provided an overview of successes and challenges in management of Coral Reef Marine Protected Areas and the executive summary of lessons learned from a range of projects, including some covered in this report, reflect the general context of needs for effective coral reef management:

1. Greater community empowerment and involvement;
2. Sustained and extensive consultation between stakeholders;

3. Proactive and innovative education and public awareness campaigns;
4. Improved communication and transparency between all involved members;
5. Strong management partnerships to secure long-term financial stability;
6. Development of management plans based on ecological as well as socio-economic data and linked to regular monitoring programs;
7. Implementation of clearly defined zoning regulations to reduce conflicts between stakeholders; and
8. Enhanced enforcement efforts.

The reality of many coral reef projects is that they are introduced in remote areas and often with poor and poorly educated local communities in an attempt to halt and reverse existing trends of degradation or detriment to biodiversity and the natural resource base. The nature of the necessary engagement with the communities whose activities affect coral reefs raises particular issues relating to the nature of project management. These are reflected in 4 more themes in lessons learned from the projects reviewed for this report:

1. The special nature and scarcity of available skilled personnel capable of working effectively to build and maintain partnerships, trust and consultation within remote communities;
2. The importance of capacity to respond to unpredictable natural or political events that impact on the design and timeline of a management project;
3. The challenge of designing efficient and cost-effective reporting to meet the needs of multiple donors while maximizing the proportion of effort applied to on-ground project activities; and
4. The challenge and the timescale of achieving sustainability in terms of transfer from project funding to a basis where the costs of management can be met through a package of community, private sector and government recurrent programming.

### **Methods**

This project surveyed 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. Preliminary review of the GEF projects indicated that 30 GEF projects were chosen for detailed analysis. These had sufficient focus on tropical coastal ecosystems, were either completed or far enough along to have gathered lessons learned information, or had sufficient available documentation. One GEF project, Coral Reef Targeted Research, primarily involved research rather than management. A full review of this project was not conducted, but one project output, a best practices manual for coral reef restoration, was used.

In order to gather additional complementary information, we examined 50 non-GEF funded projects, based on a variety of criteria. Of these, 26 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 projects, we found eight general issues that were of primary importance to coral reef managers.

## ISSUE 1: Project design

External donor funded projects, through their preconceived goals, objectives and time frames, are often inclined to fail in part or at least to not be sustainable beyond their life. The dependence on external assistance creates both the potential for and the reality of non-sustainable ICM institutions and policies as projects are terminated and staff withdrawn. The majority of community-based coastal resource management projects are not maintained after funding and external technical assistance end.

Problems in project design can lead to difficulties in implementation and sustainability of project. Thus, projects must be carefully designed to reach the desired outputs and outcomes. In order to overcome these threats and barriers, project design should meet the following three objectives:

1. Ensure the project goals are clearly articulated and understood by stakeholders;
2. Ensure that project is relevant and responsive to coral reef management issues;
3. Ensure project outcomes are achieved within the proposed funding and timeline.

From our review, the most common threats or barriers to effective project design include:

- Unrealistic project goals or timelines
- Insufficient coordination between partner agencies
- Insufficient capacity (human, financial and equipment) to perform proposed work
- Excessive donor requirements for restrictive frameworks, reporting requirements and funding schedules that impair flexibility to complete the project

## Key lessons learned and recommendations

- Participatory processes are critical and need to be designed into the project and operationalized before the project starts
- Project design must include a realistic assessment of the capacity and infrastructure available and future sustainability
- Projects should be marketable not only to donors but to stakeholders and government also
- Costs and benefits of partner involvement need to be evaluated and utilized as much as possible to build capacity and ownership of the project
- Attempts should be made to determine the feasibility of projects through pilot or planning grants, or other feasibility studies

## ISSUE 2: Project management

Management of coral reef projects is similar to managing other natural resources where there is a need to follow a management cycle whose complexity will depend on the objectives of the project and the size of the project. Coral reef management involves the management of people, tools and equipment to meet common objectives including:

1. Realistic planning that entails defining and allocating tasks to implement the objectives, accurate allocation of time for each task, allocation of adequate resources (human, financial and tools) and setting of manageable deadlines;
2. Clarifying people's roles and lines of communication, developing budgets, setting up appropriate controls and schedules for each activity;

3. Monitoring of progress and final evaluation of progress;
4. Timely dissemination of information required for each activity.

## Key lessons learned and recommendations

### *Coordination*

- It is essential to establish an effective coordination mechanism including adequate management structures and operating systems
- Clear roles and responsibilities are needed for each component of the project including the advisory committees
- Establish all partner agreements prior to implementation
- Partnerships need continuous support and networking

### *Finances*

- Adequate funds and other resources including staff should be in place prior to implementation
- Flexibility in the allocation of funds (i.e. a mechanism for timely reallocation of funds to meet changes at the local level)
- Sustainable financing mechanisms should be explored and, if possible, tested before the end of the project

### *Reporting*

- Frequent assessments allow for flexibility and rigorous monitoring of progress but should not detract from implementation of project activities
- Reporting should be against effective indicators of progress to allow for objective evaluations

### *Implementation*

- IT tools and GIS are useful for integrating multiple factors and agencies
- Municipal/Local government engagement is important for achieving effective implementation
- Committed, motivated, peer respected individuals are essential at all levels of implementation

### *Monitoring and Evaluation*

- Adequate time should be given to evaluate projects especially large, complex and regional projects
- Collect appropriate monitoring information that allows evaluation of the project
- External peer review of reports can increase the profile, transparency and respect for the project

## ISSUE 3: Community participation

Community-based coral reef management (CBCRM) is a process by which the public is given the opportunity and/or responsibility to manage their own resources, define their needs, goals, and aspirations, and make decisions affecting their well-being. It starts from the basic premise that people have the innate capacity to understand and act on their own problems. Essentially, CBCRM builds on what the community thinks and allows each community to develop a management strategy that meets its particular needs and conditions. Its approach is people centered and driven by consensus. The core of CBCRM is community organization, where empowerment is a primary concern.

Underlying many local CBCRM initiatives is a sense of ownership of management arrangements that tends to foster a high degree of commitment and rule compliance. For example, involving communities in environmental monitoring programmes provides them with first-hand information of the impacts of their management interventions. Natural resource monitoring by communities is an economically attractive option provided experts properly train and calibrate monitors. The participatory establishment of closed areas ('reserves') encourages compliance and reduces the costs and needs for an extensive enforcement system.

### Key lessons learned and recommendations

- Projects that did not emphasize CBCRM did not achieve full potential. Successful projects had strong co-management structure, community empowerment and a decentralized decision making process
- Dynamics, diversity and respected leadership within the community increase chances of success
- Involving key community leaders and marginalized groups can provide critical support that could not be otherwise sourced
- There is no single approach to community engagement

- Social context research is a prerequisite to the design phase
- Knowledge management and information flows need to be relevant and shared within the local community

## ISSUE 4: Partnerships and linkages

Resource management cannot operate in a vacuum and this is particularly true of coral reef management couched in a framework of integrated coastal and watershed management. It is even truer when community-based or co-management approaches are involved. Increased collaboration between coral reef managers and stakeholders can lead to less conflict and the development of policies that assist in the smooth running of the management programs. Overlapping mandates and conflict of interest primarily between coral reef managers and other government departments with interests in the coastal zone continue to be a challenge in many countries, as do conflicts between user groups (e.g. fisheries and tourism). These sectors have the greatest influence coral reefs and coral reef management. Increased consultation between coral reef managers and other departments may lead to some improvements, but ultimately a coral reef management program must, from its inception, link all stakeholders and seek to reduce conflicts.

### Key lessons learned and recommendations

- Cross-sectoral linkages and multi-stakeholder collaboration and integration builds capacity, sustainability, and a more effective implementation approach, creating a more comprehensive project
- Costs and benefits of private sector involvement need to be evaluated and should be involved early in the development to assure buy-in and long-term engagement
- Economic and other incentives need to be clearly identified and communicated in order to maintain stakeholder interests and manage expectations

## ISSUE 5: Policy, legislation and enforcement

This review identified four key issues in coral reef management policy. These include legislation, zoning, transboundary issues and enforcement.

The failure of national laws to resolve and assign effective roles and strategies for natural resources management has caused increasing conflicts throughout the world. This

is particularly evident in developing countries, where the social and economic conditions of its peoples are low. Many national laws tend to the state-centered, centralized approach for resource management and discourage any existing community-based systems. However, recent years have witnessed the emergence, in an increasing number of countries, of important new laws designed to be more supportive of community initiatives.

An adequate and appropriate legal framework will promote sustainable development and management of coastal and coral reef resources. The complicated and inappropriate legal framework currently place in many developing tropical countries has contributed to serious degradation of coastal and marine resources. This degradation has been exacerbated by the lack of national marine policy, severe weaknesses in enforcement of natural resource laws and regulations. Often there is a general malaise or lack of commitment to sustainable management and development of natural resources.

### Key lessons learned and recommendations

- Laws need to be pragmatic and address root causes but not be unrealistic in the ability of people to change their behavior
- 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 country 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 new management

## ISSUE 6: Ecosystem based management

Until recently, the great majority of coral reef management projects have focused on immediate local threats and not on upland or watershed activities, or other non-point sources of impact. Many projects focus on small areas of a large ecosystem and fail to take ecological and social linkages into consideration. The management of the surrounding areas is often the major driver of changes within the managed area. Efforts to achieve holistic management must consider not only the fish and the coral reef resources but also the ecological, social, economic, and political aspects that involve all stakeholders. A key component of such a strategy would be promotion of healthy coral reef ecosystems by ensuring that economic development is managed in ways that maintain

biodiversity and long-term productivity for sustained use of these systems.

The primary goals of ecosystem-based management are to:

1. Integrate wise land use and watershed management practices with coral reef management under integrated coastal management umbrella;
2. Apply a holistic, ecosystem-based approach to all human use and impacts relevant to coral reef management.

### Key lessons learned and recommendations

- EBM/ICOM should be informed by science but care must be taken in translation between the advocacy vs. objective technical advisory role of science
- Management regimes that are designed to meet community goals can achieve greater compliance and subsequent conservation success than regimes designed primarily for biodiversity conservation
- Coral-reef conservation based on large MPAs with weak enforcement may be ill-suited to the social, economic, and cultural context of many communities within the center of coral diversity, and insistence on these conservation methods may lead to polarization between national-government regulators and local communities
- Local action plans should be based on locally perceived threats/issues and sound data on local resource status
- Iconic species and charismatic habitats can be useful for marketing an EBM approach
- Management of coral reef should be addressed through integrated and holistic management of related ecosystem and land use

## ISSUE 7: Monitoring and evaluation of coral reef management

The greatest problem facing coral reef ecosystems is unsustainable resource use and other human impacts. The purpose of monitoring and evaluating coral reef projects is to assess the performance of management to halt and reverse the decline of coral reefs. Specifically, the goals of monitoring and evaluation are:

1. To quantify change in the socio-ecological system;

2. To assess the impact of anthropogenic activities;
3. To appraise how effectively functions/activities were executed;
4. To evaluate perceptions/attitudes and values of change among stakeholders.

Threats or barriers to monitoring and evaluation include:

- Incomplete knowledge of resource use and production
- Difficulties of changing people's behavior
- Lack of alternatives to current resource use or other behavior patterns
- Lack of adequate capacity (skills and resources) to manage

### Key lessons learned and recommendations

- Careful consideration and collaboration of design elements will ensure that the program has relevance to stakeholders and long-term value to the project and similar future projects (to avoid changing methodologies in ways that invalidate time series)
- Implementation requires sound management and involvement of people and resources in order to complete work efficiently and in a repeatable manner that reduces the many potential sources of error
- Dissemination requires knowledge of the audience, what they can do, and what information they need to affect changes in behavior
- Monitoring and performance evaluation are long-term activities and should be adequately funded and supported

## ISSUE 8: Capacity, education and knowledge management

Coral reef management can require a high degree of capacity, depending on the complexity of the management program. In addition, education of managers, policy makers, resource users, and the general public is critical to management success.

### Key lessons learned and recommendations

1. Project designs should reflect likely availability of skilled personnel;

2. Pay attention to the time it will take for the project to achieve the pre-implementation needed to support the intended project outcomes;
3. Establish a decision point for confirmation of the project and confirming or revising a timeframe that is realistic for project completion;
4. Regional mentoring, peer networks, attachments and exchanges can support and accelerate development of operational capacity;
5. Make clear the skills and experience required within the project implementing team and focus capacity on these needed skills rather than more broad or generic training;
6. Expert advisory groups can help and support development of capacity and program management but their roles should be clearly defined to avoid issues of control of project management;
7. Community engagement in management and monitoring builds effective management capacity and confidence of project staff.

## 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 and maintain function.

Current coral reef 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.

This Lessons Learned is based on the project NR-0815-UNE Knowledgebase for Lessons Learned and Best Practices in the Management of Coral Reefs, with contributions from M. Tupper, J. Oliver, R. Kenchington, T. McClanahan, N. Muthiga, D. Gill, D. Burnham, S. Campbell, N. Andrew, R. Mahon and D. Walfoort.



[gefll.reefbase.org](http://gefll.reefbase.org)    [www.reefbase.org](http://www.reefbase.org)

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).



For more information, please contact Dr. Mark Tupper at [m.tupper@cgiar.org](mailto:m.tupper@cgiar.org).

#### The WorldFish Center

PO Box 500 GPO, 10670 Penang, Malaysia  
Tel: +(60-4) 626 1606 Fax: +(60-4) 626 5530  
Email: [worldfishcenter@cgiar.org](mailto:worldfishcenter@cgiar.org)

© 2008 The WorldFish Center

All rights reserved. This brief may be reproduced without the permission of, but with acknowledgment to, The WorldFish Center.



**WorldFish**  
Supported by the CGIAR