



French Global
Environment Facility

Marine Protected Areas

Review of FGEF's cofinanced project experiences



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Study coordinated by:
FGEF: Julien Calas

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This study is the result of an external thematic assessment commissioned by the FGEF from an independent consultancy. The points of view it expresses are those of the consultants and do not necessarily reflect those of the French Global Environment Facility. The assessment concerns a limited sample only of marine protected areas in the tropics, and seeks only to disseminate the lessons learned from project experiences as widely as possible. It therefore does not aim to offer an exhaustive state-of-the-art report or a set of rules for the establishment of marine protected areas.

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*“ Each time I reason,
each time I use logic,
I’m extremely pessimistic.
When I use my heart, when I use my faith
– and I have a stainless faith in mankind –
then I become optimistic.
A situation will arise that will awaken people,
and we will suddenly understand that we have to join forces. ”*

Jacques – Yves Cousteau

Contents

This capitalisation study is in three main parts:



1- In this document:

- Executive summary of information gathered and lessons learned from this exercise to capitalise on project experience,



2- In the attached CD:

- Thematic studies containing more detailed analytical reports on project experience with recurrent marine protected area issues,



3- In the attached CD:

- Synoptic files providing an overview of projects and marine protected areas that have received FGEF support and make up the sample used for the analysis.



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Preface



France has an important role and extensive responsibilities in protecting the world's oceans. It is the world's third largest maritime power with an Exclusive Economic Zone (EEZ) covering 11 million km², and has the fourth largest area of coral reefs representing biodiversity hotspots.

According to a recent Nature Conservancy assessment, only 1% of marine areas (as against 12 % of all land areas) are officially protected today, despite government commitments under the UN Convention on Biological Diversity to place 10% of all marine areas under protection by 2012. Furthermore, only 4 % of coastal areas across the globe are under protective measures, and their coverage is very uneven (70% in New Zealand and less than 2% in the Mediterranean). Protection of the world's marine environment therefore still demands major efforts.

In today's context of a worldwide economic and environmental crisis and scarce financial resources for intervention, action is not only urgent but also needs to be relevant and closely targeted.

Since 1994, the FGEF, a public financial instrument dedicated to support for operations relating to the global environment and sustainability in developing countries, has financed numerous projects for marine biodiversity protection and the establishment of marine protected areas, thus contributing to the protection of over 70 marine protected areas across the world covering over 8 000 km².

This review sets out share the lessons learned from experience in marine biodiversity protection with all of the organisations involved, in order to promote opportunities for working in synergy.

The work undertaken is consistent with French government guidelines, for example for the creation of the National Agency for Marine Protected Areas (AAMP) in 2006, development of marine parks under the European Natura 2000 directive, mobilisation of the first national MPA congress organized by the IUCN in December 2007 and the French Senate report in 2008 on assessments of fishing stocks and fisheries management.

It sets out to act upon the conclusions of the July 2009 "Grenelle" Round Table on Oceans and the resulting commitments set out in the "Blue Book". Noting that ours is the last generation that still has every capacity to act before it is too late, the French President expressed the will to ensure effective protection of 10% of France's maritime area by 2012, and of 20% (over 2 million km²) of the 11 million km² of ocean waters under French jurisdiction by 2020.

Beyond this French agenda, the FGEF interventions attempt to contribute to the strategic objectives and new concepts discussed in the international arena.

In this regard, the FGEF intends, on the basis of experience gained and described in this report, to draw on the ecosystem approach, which aims to develop knowledge and integrated management of terrestrial, coastal and marine areas in compliance with the decisions taken to the Fifth Conference of Parties to the CBD. It will promote cooperation between marine protected areas and regional fisheries organizations in order to address and coordinate the issues of fisheries and conservation of marine and coastal biodiversity.

Finally, the FGEF mean to contribute to the implementation of the Plan of Action adopted at the Earth Summit in Johannesburg (2002) which calls on countries to promote in 2012 "representative networks of marine protected areas" established according to recognized ecological principles (representativeness, connectivity, resilience) and to join in international efforts to establish MPAs in areas beyond national jurisdiction.

France thus has a clearly demonstrated strategy in favour of marine biodiversity protection, and the FGEF will make every effort to strengthen its programme priorities to meet these goals.



Lucien Chabason,
IDDRI Deputy Director
Member of FGEF Scientific Committee

Marc-Antoine Martin,
FGEF General Secretary

(1) Published in *Conservation Letters* magazine.

Acronyms

AFD	French Development Agency
AGRRA	Atlantic and Gulf Rapid Reef Assessment (http://www.agrra.org/)
AL	Alternative Livelihoods
AMA	Association for the Environment (Mozambique)
Andaman Coast (Project)	Project for "Marine protected areas network and sustainable tourism on the Andaman coast"
CCP	Community Fishing Council (Quirimbas National Park – Mozambique)
CBD	Convention on Biological Diversity
CHARM	Coastal Habitats and Resources Management Project (Thailand, with EU financing)
CI	Conservation International NGO
CITES	Convention on International Trade in Endangered Species of Flora and Fauna
CNRS	National Centre for Scientific Research (France)
Cocos Island (Project)	Project for "Biodiversity protection in the Cocos Island Marine conservation area"
COMDEQ	Committee for the Development of Quirimbas National Park (Mozambique)
CORDIO	Coral Reef Degradation in the Indian Ocean
COREMO	CORal REef MONitoring, software package for coral reef monitoring linked to ReefBase and FishBase (http://www.coremo3.com/)
CINP	Cocos Island National Park (Costa Rica)
CPUE	Catch Per Unit Effort
CRISP (Project)	Coral Reef InitiativeS for the Pacific.
CRTR	Coral Reef Targeted Research & Capacity Building for Management (GEF/World Bank international research programme)
DFID	Department For International Development (UK)
DTSI	Directorate for information Technologies and Systems (New Caledonia)
EARO	IUCN East Africa Regional Office
EIRR	Economic Internal Rate of Return
ESDU	Environment & Sustainable Development Unit, OECS
FAD	Fish Aggregating Device
FGEF	French Global Environment Facility
FLMMAs.	Fiji Local Marine Management Areas
FIBA	International Foundation for the Banc d'Arguin (NGO)
Fish Base	International database on fish (http://www.fishbase.org/)
FSPI	Foundation for the Peoples of the South Pacific International (NGO)
GCRMN	Global Coral Reef Monitoring Network (http://www.gcrmn.org/)
GEF	Global Environment Facility
GIS	Geographic Information System
ICRAN	International Coral Reef Action Network
ICRI	International Coral Reef Initiative
IMS	Institute of Marine Sciences, University of Dar es Salaam
IOC	Indian Ocean Commission
IRD	Institute for Development Research (France)
IUCN	International Union for the Conservation of Nature
LMMA	Locally Managed Marine Areas
MAEE	Ministry of Foreign and European Affairs (France)
MAR (Project)	Meso-American Reef or "Conservation and Sustainable use of Coral Reefs in the Meso-American Ecoregion"

Acronyms

Marxan	Freeware application for planning and circumscribing protected areas (MARine spatially eXplicit ANnealing)
MBREMP	Mnazi Bay - Ruvuma Estuary Marine Park
Mnazi Bay (Project)	Project for "Management planning for the Mnazi Bay Marine Park and Ruvuma Estuary"
MOU	Memorandum of Understanding
MPRU	Marine Park and Reserve Unit
MRNT	Ministry of Natural Resources and Tourism,
Narou Heuleuk (Project)	Project for "Preservation of fish resources by fishing communities"
NGO	Non Governmental Organisation
NMPA IOC (Project)	Project for a "Network of Marine Protected Areas in the Indian Ocean Commission Countries"
OBIS	Ocean Biogeographic Information System
OECS	Organisation of Eastern Caribbean States
OPAAL (Project)	OECS Protected Areas and Alternative Livelihoods
OPESCA	Regional organisation for fisheries and aquaculture in the Central American Isthmus
Polynesia Mana and Tokelau)	Sub-regional GCRMN node for Polynesia (covering French Polynesia, Wallis and Futuna, Cook, Niue, Tonga, Kiribati)
Quirimbas (Project)	Development Project for the Quirimbas National Park
ReefBase	GCRMN coral reef information system (http://www.reefbase.org/main.aspx)
ReefCheck	International network of coral reef monitoring organisations working to a standardised protocol. (http://www.reefcheck.fr/)
REI (Project)	Project for "Rehabilitation of island ecosystems: eradication of invasive exotic species and reintroduction of threatened endemic species"
Sem Pacifika	Socio-economic monitoring of MPAs in the Pacific
SMMA (Project)	Soufrière Marine Management Area or "Protection and Livelihoods from Coral Reefs in the Lesser Antilles"
SocMon	Global SOCio-economic MONitoring, Initiative for Coastal Management. Programme for socioeconomic data collection to support coastal zone management (http://www.reefbase.org/socmon/).
SOPAC	Pacific Islands Applied Geoscience Commission
SPC	Secretariat of the Pacific Community
SPREP	Secretariat for Pacific Regional Environment Programme
STC	Scientific and Technical Committee (of the FGEP)
TCMP	Coastal Management Partnership (integrated coastal zone management project)
TNC	The Nature Conservancy (NGO)
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNDP	United Nations Development Programme
UNF	United Nations Foundation
UNEP	United Nations Environment Programme
UNEP-DTIE	UNEP Division of Technology, Industry and Economics
utando	a small/zero mesh size fishing method (mosquito net or cloth) used by women
VLC	Village Liaison Committee
WB	World Bank
WCPA	IUCN World Commission on Protected Areas
WCS	Wildlife Conservation Society (NGO)
WEHAB	Water, Energy, Health, Agriculture and Biodiversity Framework
WIO	Western Indian Ocean
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature (NGO)

1

Introduction and study objectives

The French Global Environment Facility (FGEF) is a public bilateral financing instrument established in 1994 by the French government following the Rio Summit. It is additional to the French contribution to the Global Environment Facility (GEF). Its resources for 1994 to 2010 amount to 277,5 million €.



Fishing boats in Matemo, Quirimbas (© C. Gabrié)

The FGEF

The FGEF's overall objective is to encourage developing and transitional countries to adopt and implement strategies, programmes and projects for sustainable development that are compatible with the long-term preservation of our planet's ecological equilibrium.

To achieve these aims, the FGEF contributes grant financing to development projects that produce an enduring impact by addressing the following global environment issues:

- biodiversity
- climate change
- international waters
- desertification and land degradation
- persistent organic pollutants (POP)
- the ozone layer (Montreal Protocol)

Projects financed by the FGEF aim to foster conservation and sustainable uses of biodiversity, to promote sustainable natural resource management, to contribute to better management of international waters and to reduce consumption of fossil or organic carbon.

The FGEF's steering committee, assisted by its scientific and technical committee, is responsible for decision-making.

The steering committee establishes policy guidelines concerning intervention, priority thematic areas, geographical zones, main partners, organisation, criteria and preferred methods or technologies. These guidelines form the FGEF's strategic programming framework (CPS) established for two-year periods.

The review study

The FGEF has selected projects from its portfolio that contribute to marine biodiversity conservation and directly or partly concern Marine Protected Areas (MPAs) in tropical zones. These projects are helping to create or to strengthen over 70 MPAs with widely varying characteristics (age, size, status, governance). All are located in the tropics and all but 2 concern coral reefs. When this study began, most of the projects had reached the mid-term or final assessment stage. One more project, supporting the Soufrière Marine Protected Area (SMMA) in St Lucia and completed in 2002, was also included in the sample to enable an assessment five years after grant financing came to an end, providing feedback after a significant lapse of time.

The FGEF decided to use these projects as a basis to capitalise on the main lessons drawn after 10 years of experience in the topic area concerned, and to assess methods of intervention that produce positive impacts for marine biodiversity conservation and for the populations living in these zones.

The purpose of this work is to learn from experiences and to disseminate them

The objectives of the study are to:

- synthesise lessons learned and disseminate experience gained through these projects, giving particular attention, in the case of marine protected areas, to the extent to which tools are adopted to assess management effectiveness and characterise impacts,
- assess the socio-economic benefits to local populations that effectively result from the projects,
- identify and share good practice (methods that work, tools of particular interest, approaches that have proved effective, mistakes to be avoided, etc.),
- foster exchanges between projects and the main stakeholders concerned (transfer of experiences).

The aim is not to produce a state-of-the-art review of each conservation and development topic addressed by the projects, but to build on and use ongoing efforts by the Ministry of Foreign and European Affairs, the Ministry of Ecology, Energy, Sustainable Development and the Sea and the French Development Agency, using the means provided by the French Global Environment Facility (FGEF), in the area of marine environmental protection. A further aim is to measure the biological and socio-economic impacts of these projects.

Review topics

The main review topics are:

- **1 : Designing MPA projects:** identification, feasibility studies, institutional and financial set-up, duration, partnerships, participation, monitoring and costs,
- **2 : MPA creation, management and governance:** planning and identifying networks of sites to be protected, MPA implementation phases, status, governance (management body, type of management and extent of participation), zoning, management plan, business plan, surveillance, monitoring of management effectiveness,
- **3 : Financing MPAs in the long term:** potential costs and revenues: entrance fees or activity taxes, activities implemented to cover MPA costs, trust funds, etc.,
- **4 : Alternative livelihoods (AL):** identification of ALs and beneficiaries, feasibility studies, partnerships, accompaniment, benefits and benefit-sharing rules,
- **5 : Managing fisheries:** preliminary studies, fisheries management plans, management methods (from regulated fishing to strict fishing bans), alternative fishing activities, monitoring, surveillance, eco-certification,
- **6 : Managing tourism:** linking MPAs and tourism, potential contributions from tourism to MPA management,
- **7 : Scientific research and monitoring of MPA impacts:** systems for monitoring MPA functioning and environmental status, and methods for monitoring the biological and socio-economic impacts of MPAs,
- **8 : Economic assessment and calculation of the Economic Internal Rate of Return (EIRR) of MPA projects:** choice of parameters, methodologies, assumptions and limitations, data sources, examples.

Each of these topics is addressed in a specific chapter in Part 2 of this study, "Thematic analysis reports" - (within the attached CD).

The chapter 6 of this report synthesizes the summaries of those eight "thematic analysis reports".

(1) Several projects for marine environmental protection are also running in the Mediterranean but are not included in the sample for this study.



Study method

Map above:
Location of the projects in the study sample.

The reviewed projects cover about thirty countries, within seven large regions (or eight ecoregions)

(1) Project on "Protected Areas and Benefit Sharing in the Organisation of Eastern Caribbean States".

(2) Project on "Rehabilitation of Island Ecosystems".

(3) Programme under the "Coral Reef InitiativeS for the Pacific", assessed jointly by the FGEF and AFD.

In practical terms, the study was organised on the basis of:

- Analysis of a sample of 11 projects, covering their presentation reports, assessment reports, the various documents produced during the project and additional information requested from the project developers,
- Visits to 8 of these projects to develop case studies for review and also:
 - mid term assessments (OPAAL⁽¹⁾ in the Caribbean, REI in the Seychelles⁽²⁾ and the CRISP programme in the Pacific⁽³⁾),
 - ex-post assessments (Narou Heuleuk in Senegal and the Mnazi Bay Marine Park in Tanzania),
 - ex post assessment 5 years after the end of grant funding (SMM, St Lucia),
 - Lessons learned study only: project for protection of Meso American reefs and support to the Quirimbas national Park in Mozambique.

An assessment and/or review report was produced during each of these missions.

All of the material collected and analysed by topics, as described above, was used to develop the review and to highlight experience gained, project output and the main lessons.

The 8 topics selected for thematic analysis were first assessed (see chapters in Part 2). Each thematic assessment follows the same pattern, with a brief introduction followed by a description of the different activities conducted in each MPA. Given the specific features and varying objectives of the projects and their state of progress, these chapters are not necessarily uniform. Each chapter ends with the conclusions and lessons drawn from the analysis of the experiences and approaches of the projects in our sample.

Part 1 is the executive summary of the review based on these 8 thematic reports. The summary provides a recap of the conclusions from the 8 thematic studies and a synopsis of project and MPA characteristics, analyses of positive experiences to be built upon and points where progress is needed.

The approach is based on a logical framework summarised as a simplified diagram (figure 1), which was used to organise the analysis and to identify the links between different factors of success or failure of MPA projects, from creation through to self-sufficiency.

FIGURE 1

Specific background of each MPA influencing conditions at start-up and sustainability

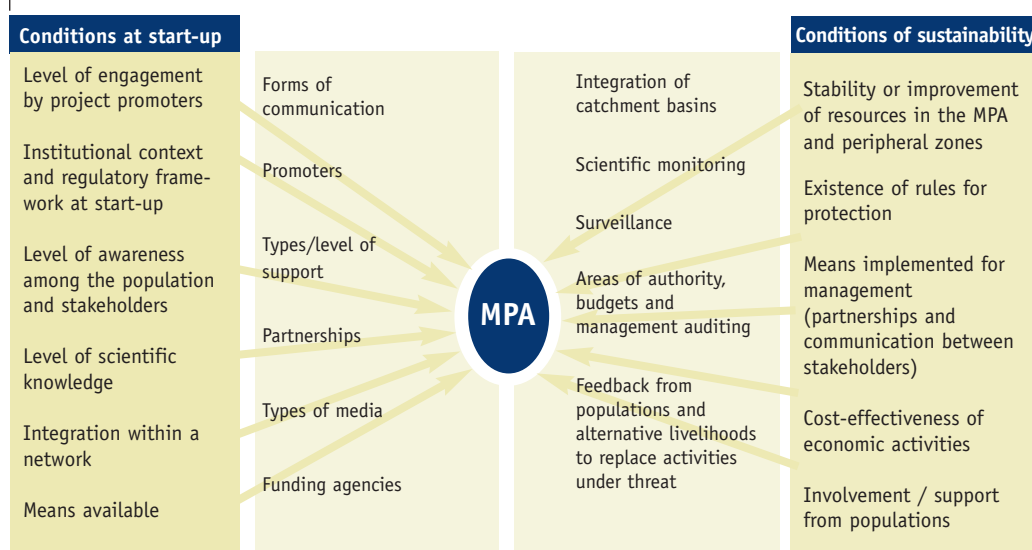


TABLE 1

List, regions and abbreviated names of projects used for review purposes and type of studies conducted (assessment or lessons learned only). – The names used in the remainder of this study to locate or refer to the projects are given in bold –

Project n°	Country or region	Project name (abbreviated and in full)	Date of assessment	Type of assessment
CZZ 1294	Meso-America: Honduras – Guatemala	MAR Project (Meso-American Reef) or “Conservation and Sustainable Use of Coral Reefs in the Meso-American Eco-Region”	11/04 to 26/04/2008	Lessons learned with field mission
CCR 1001	Costa Rica	Cocos Island project or “Biodiversity Protection in the Cocos Island Marine Conservation Area”	March 2009	FGFE supervisory mission
CLC 1007	St Lucia	SMMA Project (Soufrière Marine Management Area) or “Protection and Sustainable Use of Coral Reefs in the Lesser Antilles”	November 2007 (2 weeks)	Assessment 5 years after end of financing
CZZ 1279	Caribbean - Organisation of Eastern Caribbean States (OECS): Dominica, St Vincent & the Grenadines, St Kitts & Nevis, St Lucia and Antigua & Barbuda	OPAAL Project (Organisation of eastern caribbean states Protected Areas and Alternative Livelihoods) or “Protected Areas and Benefit Sharing in the Eastern Caribbean States”	October 2007 (2 weeks)	Mid-term assessment, in collaboration with A. Putney
CSN 1202	Senegal	Narou Heuleuk Project or “Preservation of Fish Resources by Fishing Communities”	5 to 20 December 2007	Final assessment
CTZ 1012	Tanzania	Mnazi Bay Project or “Management Planning for the Mnazi Bay Marine Park and the Ruvuma Estuary”	27/01 to 11/02/2008	Final assessment
CMZ 1067	Mozambique	Quirimbas Project or “Development Project for the Quirimbas National Park”	16/10 to 3/11/2008	Lessons learned with field mission
CSC 1000	Seychelles	REI Project or “Rehabilitation of island ecosystems: eradication of invasive exotic species and reintroduction of threatened endemic species”	Mai 2008 (2 weeks)	Mid-term assessment
CZZ 1293	Indian Ocean Commission (IOC) Seychelles, Mauritius, Rodrigues, Madagascar, Comoros, Réunion	NMPA IOC Project or “Network of Marine Protected Areas in the Countries of the IOC”		Lessons learned
CTH 1001	Thailand	Andaman Coast Project or “Network of Marine Protected Areas and Sustainable Tourism on the Andaman Coast”		Lessons learned
CZZ 1282	South Pacific (Samoa, Cook Islands, Solomon Islands, Fidji, Vanuatu, Kiribati, Tonga, Tuvalu, Wallis and Futuna, New Caledonia, French Polynesia)	CRISP Project “Coral Reef InitiativeS for the Pacific” or “Contribution to the Regional Initiative for Coral Reef Protection in the Pacific”	February – March 2008 (7 weeks)	Mid-term assessment



Training session on oysters collection without damaging mangrove trees - Casamance's MPA (© Océanium)

Description of the projects

The list of projects in our sample and their abbreviated names used in the remainder of the study are listed in table 1 page 9. Their location (country or region) is given in map page 8.

Location and context

The projects concern some 30 countries in 7 major regions (8 ecoregions):

- **Central America:** Guatemala, Honduras, Costa Rica;
- **Caribbean:** Dominica, St Vincent and the Grenadines, St. Kitts and Nevis, Antigua & Barbuda, St Lucia;
- **West Africa:** Senegal;
- **East Africa:** Tanzania and Mozambique;
- **Indian Ocean:** Seychelles, Madagascar, Comoros, Mauritius, Rodrigues and La Réunion;
- **South East Asia:** Thailand;
- **South Pacific:** this project covers the French territories of New Caledonia, French Polynesia and Wallis and Futuna. Neighbouring countries concerned by the programme are the Federated States of Micronesia, the Fiji Islands, Cook Islands, Marshall Islands, Solomon Islands, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Tokelau, Tonga, Tuvalu and Vanuatu, a total of 16 territories and countries. The zone has about 10 million inhabitants, and the countries concerned harbour the majority of our planet's coral reefs. In practice, programme activities were significant in only about two thirds of these countries.

Four are regional projects involving 2 to 16 countries: MAR (Meso-America), NMPA-IOC (Indian Ocean Commission), CRISP (South Pacific) and OPAAL (Caribbean). The other 7 projects concern only one beneficiary State.

The projects concern 28 eco-regions (including 16 in the CRISP programme) within the world's 232 marine eco-regions, and 3 marine 'hotspots'⁽¹⁾ (southern Mascarene Islands, Western Caribbean and Meso-America, New Caledonia).

Most of the project sites are internationally recognised as sites of worldwide biodiversity interest. Cocos Island is a UNESCO World Heritage Site and a top-ranking tourist site. The three MPA sites in the MAR project are among the 26 priority marine areas in the region. The Mtwara–Quirimbas complex (the zone covering the Mnazi Bay and Quirimbas project on either side of the border between Mozambique and Tanzania) was chosen as one of the 8 zones of world importance, among 21 of these in the entire East African eco-region and the Indian Ocean region. New Caledonia's lagoon also became a UNESCO World Heritage site in 2008.

These regions and zones of intervention were chosen on a pragmatic basis by the FGEF governance body (steering committee, supported by the scientific and technical committee in its advisory capacity and groundwork by the Secretariat) from the numerous project proposals submitted to the facility in the last 10 years.

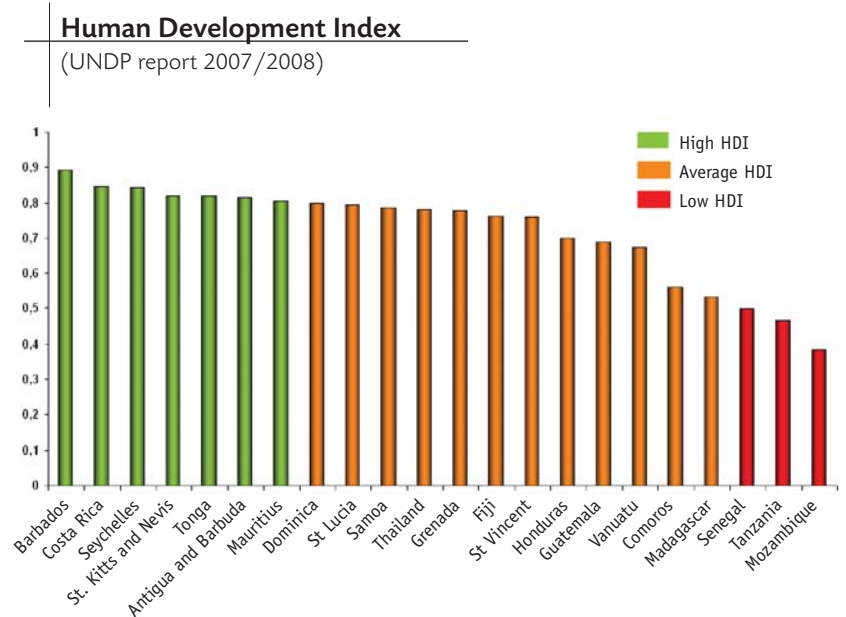
Most of the project sites are internationally recognised as sites of worldwide biodiversity interest.

The geographical, socio-economic and cultural situation in these countries and territories varies widely. According to the 2007/2008 report from the UNDP, and based on the Human Development Index ⁽²⁾ (HDI) of project countries with MPAs:

- 7 have a high HDI;
- 21 have an average HDI;
- 3 have a low HDI (Senegal, Tanzania and Mozambique).

(1) Roberts et al., 2002. Marine biodiversity hotspots and conservation priorities for tropical reefs. *Sciences*, 295: 1280-1284

(2) Calculated with average longevity indices, educational standards and living standards



Objectives and activities

Except for the mainly land-based Seychelles project, all these projects are aimed at protection of the marine heritage and its natural resources, but also at sustainable socio-economic development for coastal populations.

Our analysis of each project's overall objectives (see table 1 page 9) produced four main areas of activity:

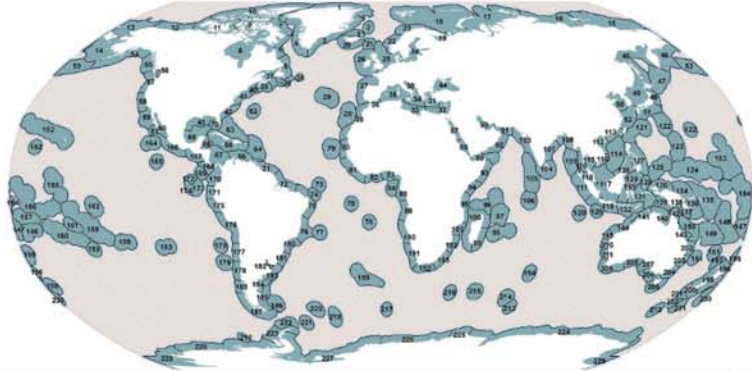

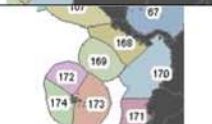

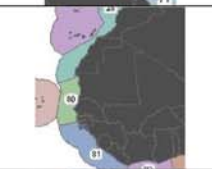
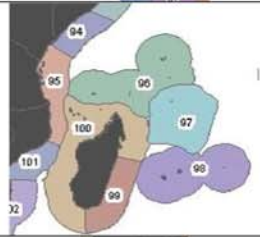

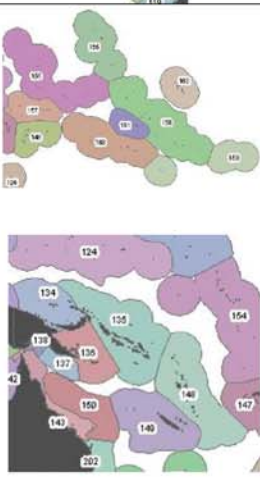
- Protection of biodiversity and its resources (all projects),
- Reducing threats or lessening impacts (Meso-America, Costa Rica, Seychelles and St Lucia),
- Strengthening conservation and management capacities (participatory or not): (Thailand, Costa Rica, Caribbean, Tanzania, South Pacific and Senegal),
- Maintaining livelihoods (Senegal, Caribbean) and/or create conditions for sustainable management in economic, social and ecological terms (Mozambique).

In most of the projects, the main focus is on approaches to participatory implementation, and the human factor is increasingly central to project objectives: "creating genuine regional dynamics between all stakeholders" (Meso-America), "participatory management" and "benefit sharing" (Caribbean), "maintaining livelihoods" (Senegal), "creating conditions for sustainable management (economic, social and ecological)" (Mozambique), "strengthening management capacities" (Thailand). The titles of objectives give priority to people over protection in 3 projects (Tanzania, Mozambique, Thailand), signalling a significant change in the last few years.

Overall project objectives (see table 2) are reflected in various targets to be achieved through different activities. The main principles of intervention, as they appear in the presentation reports, are as follows (see table 3 on activities p.15):

FIGURE 2

Project eco-regions (Source: Spalding M., Fox H., Allen G., Ferdana Z., Finlayson M., Halpern B., Jorge M., Lombana A., Lourie S., Martin K., McManus E., Molnar J., Recchia C., Robertson J., 2007. Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas. July / August 2007 / Vol. 57 No. 7, BioScience 573- 583)

Country	Province	Marine eco-regions		
				
Meso-America	Tropical Northwestern Atlantic	66 67	Southern Caribbean Southwestern Caribbean	
Costa Rica	Tropical East Pacific	169	Cocos Islands*	
Caribbean (OECS)	Tropical Northwestern Atlantic	64	Eastern Caribbean	
St Lucia				
Senegal	West African Transition	80	Sahelian Upwelling	
Tanzania	Western Indian Ocean	95	East African Coral Coast	
Mozambique		96	Seychelles	
Indian Ocean (IOC)		97	Cargados/Tromelin Island	
		98	Mascarene Islands	
99		Southeast Madagascar		
Seychelles	100	Western and Northern Madagascar		
		96	Seychelles	
Thailand	Andaman	110	Andaman Sea Coral Coast	
South Pacific	Tropical North-western Pacific Eastern Coral Triangle Tropical South-western Pacific Marshall, Gilbert, and Ellis Islands Central Polynesia Southeast Polynesia	124	East Caroline Islands	
		125	West Caroline Islands	
		134	Bismarck Sea	
		135	Solomon Archipelago	
		136	Solomon Sea	
		146	Tonga Islands	
		147	Fiji Islands	
		148	Vanuatu	
		149	New Caledonia	
		154	Gilbert/Ellis Island	
		156	Phoenix/Tokelau/Northern Cook Islands	
157	Samoa Islands			
158	Tuamotus			
159	Rapa-Pitcairn			
160	Southern Cook/Austral Islands			
161	Society Islands			

- **Eco-regional planning**, in order to identify sites of major importance for biodiversity within homogeneous eco-regions, as a basis for creating coherent MPA networks: Meso-America, South Pacific and Indian Ocean Commission.

- Support to consolidation and **strengthening of existing MPA** networks within the region or country: Meso-America, Caribbean, St Lucia, IOC, Thailand and South Pacific. Most frequently, the aim is to strengthen the institutional and legal framework of the MPAs making up the network.

- **Creation of new MPAs** (Meso-America, Caribbean, Senegal, IOC and South Pacific), or strengthening of existing MPAs (St Lucia, Tanzania, Mozambique, Caribbean, South Pacific). Depending on MPA advancement, strengthening includes support to the development and implementation of a management plan (zoning, exchanges with populations), organisation of a management team, capacity-building, infrastructure, etc.

- **Sustainable fisheries management** is an objective shared by all projects except the Seychelles project, which is rehabilitating land ecosystems. Planned activities concern co-management (organising and training fishermen, participatory fisheries monitoring and surveillance), introducing more sustainable fishing practices with exchanges of destructive fishing gear for methods more suited to environmental and resource preservation, introduction of new techniques (fish aggregating devices or FADs, artificial reefs, etc.), creation of no-fishing zones, monitoring of fishing activities and of the impacts of the protected area.

- **Development of sustainable tourism** (Meso-America – not



Sand Fly MPA in the Solomon Islands (© T. Clément)

TABLE 2

Overall objectives of the project analysed

Meso-America MAR Project	Strengthen the network of MPAs and contribute to the preservation of marine and coastal biodiversity and resources; create active regional dynamics among all stakeholders; reduce impacts on ecosystems (agriculture, tourism, fishing) in particular by developing win-win partnerships with the private sector.
Costa Rica Cocos Island	Reduce threats to marine and land biodiversity on Cocos Island by consolidating management capacities for the National Park and the ACMIC on an enduring basis and fostering sustainability principles in fishing and tourism.
Caribbean (OECS) OPAAL Project	Contribute to the conservation of natural resources and land, marine and coastal biodiversity of worldwide importance in the eastern Caribbean by creating new protected areas and improving effective and participatory management of the network.
St Lucia SMMA	In each country, support the implementation of a pilot Marine Protected Area (MPA) that can serve as a model for the establishment of national MPA networks.
Senegal Narou Heuleuk	Protect resources and enhance biodiversity in 4 identified sites, while maintaining professional livelihoods, and prepare to extend these activities to the entire Senegalese coast.
Tanzania Mnazi Bay	Ensure that local populations and authorities are able to protect biodiversity and marine resources in Mnazi Bay and the Ruvuma Estuary and to use them sustainably (by establishing a multipurpose MPA).
Mozambique Quirimbas	Create conditions to allow economically, socially and ecologically sustainable management of the Quirimbas National Park, primarily for the benefit of local populations: biodiversity conservation with joint sustainable management of a protected area.
Seychelles Project	Rehabilitate and enhance islands that are important for the conservation of indigenous biodiversity in the Seychelles by REI eradicating introduced predators, controlling invasive vegetation and reintroducing rare or endangered endemic species.
Indian Ocean Com. NMPA -IOC	Contribute to the conservation of biodiversity and marine and coastal resources in the Western Indian Ocean eco-region, through a coherent regional network of efficiently managed marine protected areas.
Andaman Coast Thailand	Strengthen capacities for biodiversity conservation, sustainable coastal zone management and sustainable management of economic activities on Thailand's Andaman coast.
South Pacific CRISP	The FGEF is contributing to funding for CRISP component 1, aiming to establish marine protected areas with catchment basin management.

financed by the FGEF – Thailand, Mozambique, Costa Rica and Senegal): promotion of good practices in the marine tourism sector, creation of partnerships with private operators, development of ecotourism and community tourism, introduction of codes of good practice, etc.

- **Development of alternative livelihoods** to reduce pressure on resources, and marine resources in particular, is a specific objective in 5 projects: Meso-America, Caribbean, Senegal, Mozambique and St Lucia.

- **Development of instruments for MPA planning and/or financial sustainability** (Meso-America, Caribbean, Mozambique, Costa Rica).

- **Strengthening surveillance** is an objective in several projects, especially the Cocos Island project in Costa Rica, to control illegal fishing. Strengthened surveillance is also under consideration in Senegal, the Caribbean OPAAL project and the SMMA project in St Lucia.

- **Improving knowledge** by developing scientific research by scientists or NGOs using rapid-assessment studies (South Pacific, Meso-America, and St Lucia). The two projects where research has absorbed the most significant share of financing are the Tanzania and CRISP projects.

- **Development of different types of monitoring** (of resources, biodiversity, socio-economic impact, management efficiency) is an objective which is common to all projects, although most of them do not have reliable benchmark data.

- **Capacity building**, both for management staff and local stakeholders (fishermen, adjacent communities), and raising awareness of

the need for environmental protection are also common to all projects. Creating networks between management bodies (South Pacific and IOC) or setting up exchange visits (Tanzania, Mozambique, IOC, South Pacific, Senegal, Caribbean and St Lucia SMMA) are the preferred means for capacity building through exchanges of experience.

The most infrequent topics are those relating to the land environment:

- **Catchment basin management**, including reducing agricultural pollution, is addressed in two projects: Meso-America (controlling pesticide use) and CRISP (fighting erosion, restoring plant cover, etc.).

- **Eradication of invasive species** (Cocos Island project in Costa Rica and REI in the Seychelles), and sometimes the reintroduction of rare or endangered species (Seychelles).

- **Establishing energy self-sufficiency** through a secure and autonomous energy supply system with no environmental impacts (Cocos Island in Costa Rica).

The topics addressed by the projects are therefore at once varied and very similar, and the aims of several projects are comparable overall: MAR in Meso-America, OPAAL, SMMA, Mnazi Bay in Tanzania and Quirimbas in Mozambique.

Nevertheless, each project has specific features that are related to the area's historical and environmental context, for example:

- In Meso-America, the regional dimension and the ecosystem approach to fisheries;

- on Cocos Island (Costa Rica), patrols to prevent illegal deep-sea fishing and management of tourist diving (about 2000 divers each year);

- At Quirimbas (Mozambique), financial self-sufficiency through tourism and local community participation in fisheries management;

- in the Indian Ocean, the network approach used by the MPA management body;

- in Senegal and St Lucia, the fisheries component is predominant;

- in Thailand, there is a strong focus on the tourism component and on building relationships with private stakeholders;

- in the Seychelles, the REI project is almost exclusively on land as it is essentially geared to the issue of invasive species in island environments.

A fishing boat in the Quirimbas Park (© C. Gabrié)



TABLE 3

Main project activities

PROJECT	MAR MESO- AMERICAN REEF	COCOS ISLAND COSTA RICA	OPAAL ORG OF EASTERN CARIBBEAN STATES	SMMA ST LUCIA	NAROU HEULEUK SENEGAL	MNAZI BAY TANZANIA	QUIRIMBAS NATIONAL PARK MOZAMBIQUE	NMPA IOC INDIAN OCEAN COMMISSION	REHABILITATION OF ISLAND ECOSYSTEMS SEYCHELLES	CRISP SOUTH PACIFIC	ANDAMAN COAST THAILAND
MPA management											
MPA planning (EcoRegional Analysis)											
Institutional and legal tools											
MPA creation											
MPA strengthening											
Training and awareness											
Infrastructure											
Management assessment and monitoring											
Business plan											
Catchment area management	Pesticides										
Fishing											
Developing co-management											
Sustainable fishing methods											
Monitoring of fisheries and impacts of protection											
Eco-certification											
Strengthening legislation											
Tourism											
Codes of good practice											
Partnerships/agreements with the private sector											
Carrying capacity											
Infrastructure											
Reducing impacts											
Eco certification/licences											
Financing to support operators											
Capacity building											
Networks/ exchanges between managers											
Surveillance											
Alternative livelihoods											
Including community tourism											
Awareness-raising/ information											
Research											
Scientific monitoring											
Eradication of invasive species											
MPA financing mechanisms (long-term)											

Project duration and advancement

With the exception of the SMMA project in St Lucia (1996-2003), all the projects are recent, with planned starting dates ranging from 2001 (Senegal) to 2007 (Thailand).

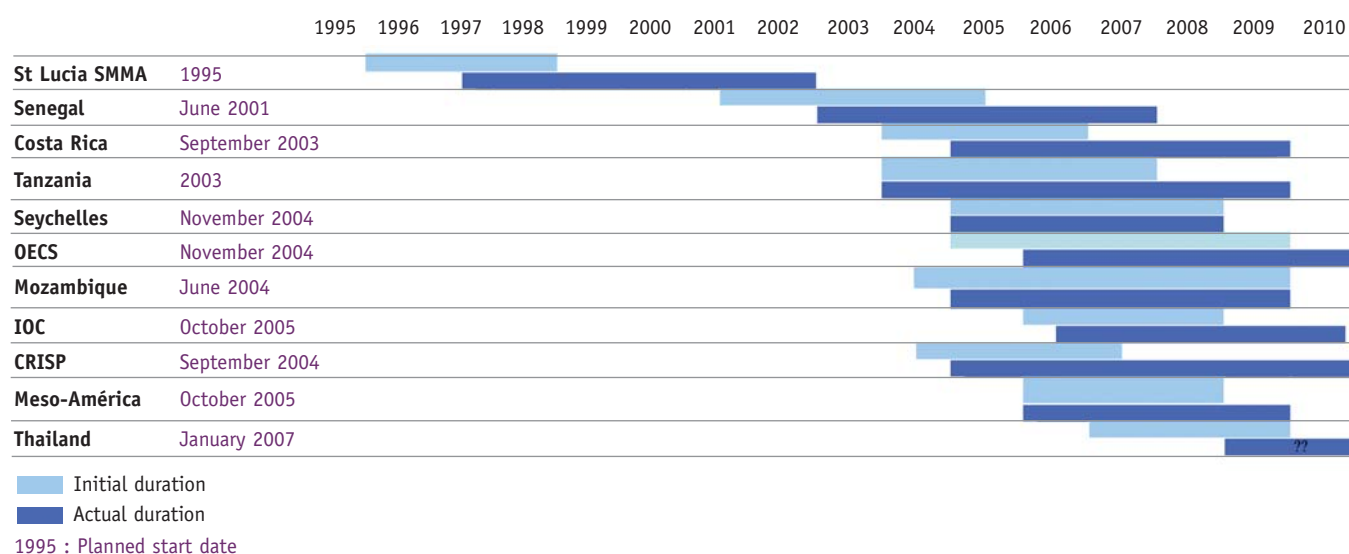
Planned project duration was 3 years for the Meso-America, St Lucia, Thailand, South Pacific and IOC projects, 4 years for the Seychelles and Senegal projects, and 5 years for the Caribbean, Mozambique and Costa Rica projects. Only two projects have been completed to date: the SMMA project (St Lucia) and the Narou Heuleuk project (Senegal). All the others are still ongoing. Figure 3 shows that none of the projects has kept to the starting dates or the schedules

given in the presentation reports. Three projects, which should have been completed or nearly so, are still under way and have requested extensions at no additional cost to the FGEF (Meso-America, Tanzania, IOC, CRISP).

Project advancement

Results from the two completed projects (St Lucia and Senegal) are very positive, although not all the initial objectives were achieved. In both cases, there was a lack of pronounced political support to project activities (due to circumstances beyond the control of the projects receiving funding):

FIGURE 3

Project start-up and end dates (as given in the presentation reports) and actual dates

- **SMMA Project (St Lucia):** the project's overall objective was to support the establishment of a pilot MPA in four countries: St Lucia, St. Vincent and the Grenadines, Dominica and Grenada. While the St Lucia project (SMMA) has been recognised as a success across the world, the objectives for the Saint Vincent and Dominica sites were not achieved because the conditions precedent to the disbursement of the FGEF grant⁽¹⁾ were not satisfied, so that both projects were cancelled before they began. At the Grenada site, the physical and institutional framework has been clarified but field activities have not yet been implemented. The acknowledged success of the St Lucia project certainly contributed to the emergence, followed by practical action a few years after the SMMA project and during the current OPAAL project, of the political will required to establish MPAs in these three countries. To date, each Member State of the Organisation of Eastern Caribbean States (OECS) has officially established at least one protected area thanks to prompting from the OPAAL project. In St Vincent and the Grenadines, the Tobago Cays Marine Park, which had not seen the light of day under the SMMA project, is now a genuine success as part of the OPAAL project.

- **Narou Heuleuk Project (Senegal):** the main objective was to protect fishing resources and enhance biodiversity in four sites along the Senegalese coast:

- at the Dakar quarry to stop dynamite fishing,
- in the Rufisque-Bargny zone to reduce pressure on juvenile fish stocks,
- in the M'bour zone to reduce damage caused by ringnets,
- in the Saloum Delta (Bamboung) to preserve fragile mangrove habitats.

Ultimately, only the Bamboung community

MPA in Sine Saloum, Senegal, has actually been established. The other sites were abandoned for several reasons: lack of local community involvement (quarry site) but especially, once again, lack of political commitment and non-appearance of the presidential decrees required to create four of the five MPAs supported by the project⁽²⁾. However, the 4 MPAs that have not been officially created by the Senegalese authorities are going ahead nevertheless, and are still being supported by the project developer, Océanium.

- **At Mnazi Bay,** although the positive outcomes are very fragile and some of activities have not achieved their goals, it may be considered that the great majority of the planned activities set out in the presentation report have been carried out.

- **At Quirimbas,** the project is well under way and a second financing phase is assured.

Several projects have obtained an extension to their activity schedule: **MAR (Meso-America), MPA Network (IOC) and Cocos Island (Costa Rica)**. Given their state of progress and the time remaining to completion (1-year extensions), it is unlikely that all the activities will be completed:

- Meso-America: 3 MPAs yet to be created, one year before the end of the project,

- Indian Ocean (IOC): a great many activities planned around small-scale fishing and tourism, as well as base studies for new MPAs, had not been implemented 1 year before the end of the project,

- Finally, the Thailand project began very late and, given the allotted schedule, will probably not meet all the objectives set out. In this case, the reasons for this situation are yet again of a political nature and related to the instability of

(1) The conditions precedent were implementation of a project coordination unit, creation of a fund for long-term activity financing and especially, adoption by the government of legislation to protect the sites.

(2) After the pre-identified sites were abandoned, the NGO Océanium was able to undertake the process of creating MPAs in 4 new sites (the project that would have initially created 4 MPAs was therefore on the verge of establishing 5).

the Thai regime (5 changes of government since the project agreement was signed). Similarly, in the OPAAL (Caribbean) or CRISP (South Pacific) projects, the set-up stage greatly underestimated the difficulties to be resolved and the time required before such regional projects can begin to function, with several island states involved and, in the case of OPAAL, limited human resources.

However, some objectives were difficult to achieve from the outset and this could have been anticipated in the project preparation stage. An example is fisheries eco-certification, which was planned as the first of its kind in the Meso-American Reef project. But studies carried out along the way showed that certification of this kind would not be possible because of the small size of the fishery.

These experiences all show that commitment from the political authorities is essential before any project begins (even if it can never be taken for granted in the medium-term), that it always takes longer than expected before projects are up and running (usually about a year) and that project programming is usually over-ambitious given the often unrealistic schedules imposed by funding agencies. The evidence shows that creating marine protected areas in 3 to 4 years is barely feasible, if at all, especially as implementation capacities are usually limited in the host countries. (See chapter on MPA project design, page 18).

Theoretical stages in MPA advancement

To compare the advancement of MPAs in the projects studied, we developed a 3-phase "score sheet" (1: "preliminary" or creation phase, 2: "pioneer" or start-up phase and 3: "self-sufficiency" phase).

Each phase is scored from 0 to 3 against criteria that reflect both project advancement and its quality. This point is described in more detail below (page 83).

MPAs score higher as they become more self-sufficient. In the portfolio of 70 MPA projects assessed, about 25 % are in phase 1, 80 % in phase 2 and only 5 % in phase 3. This shows that these projects are recent but also confirms that a great deal of time is needed before MPAs are genuinely self-sufficient.

TABLE 4

Financing planned and committed at the time of the assessments

Projects	Project end dates	Total amount planned	Total amount committed	FGEF amount planned	FGEF amount committed	AFD amount planned	% completed (inc. FGEF)
SMMA	2001	400 000	400 000	240 000	240 000		100
Cocos Island	2006	3 500 000		1 065 000	1 065 000		
Narou Heuleuk	2007	13 400 000	13 400 000	900 000	900 000	11 300 000	100
Mnazi Bay	2007	2 353 000	1 743 519	630 000	331 000		74 52 (FGEF)
CRISP	2007	8 700 000	3 517 000	2 000 000	2 000 000	5 000 000	33
MAR	2008	2 761 095	2 846 068	750 000	439 167		103 60 (FGEF)
NMPA IOC	2008	1 900 000		700 000			
REI Seychelles	2008	1 400 000	1 050 000	460 000	460 000		75
OPAAL OECO	2009	6 100 000	1 525 000	1 372 000	1 372 000		25
Quirimbas	2010	5 265 000		700 000		3 500 000	48 60 (FGEF)
Andaman Coast	2010	13 700 000		1 000 000		10 000 000	

In yellow: projects completed to date.

Institutional and financial project design

Table 5 shows the initial set-up of projects in detail (based on the presentation reports).

Overall project budgets are highly variable, ranging from 410 000 € (St Lucia, 1995) to 13 M€ (Thailand, 2007). Total financing invested in these projects amounts to 61 322 000 €, with the share of FGEF co-financing ranging from 240 000 € (SMMA) to 2 million € (CRISP), i.e., a co-financing rate ranging from 7 % (Senegal and Thailand) to 59% (SMMA).

Total FGEF grants amount to about 10 million €

Total FGEF grants amount to about 10 million € (for over 8 000 Km² of MPAs supported⁽¹⁾).

Four of the projects have received AFD financing, in addition to FGEF grants, amounting to 3.5 million € (Mozambique), 5 million € (CRISP), 10 million € (Thailand) and 11.3 million € (Senegal), or a total of 29.8 million €. These funds are most frequently, but not exclusively, invested in the fisheries and tourism sectors. The French Ministry of Foreign and European Affairs (MAEE) contributed about 2.5 million €, mostly through secondment of technical assistants (St Lucia, IOC, Senegal, Seychelles and South Pacific).

Altogether, for the sample analysed in this study, the French cooperation system has contributed almost 42 million € in the last 10 years to marine resource protection and sustainable fisheries development and tourism in the tropics.

The total number of funding agencies per project is variable, ranging from 2 (St Lucia, Senegal, Tanzania, Mozambique) to 6 or 7 (Thailand), and sometimes more (South Pacific). The main agencies co-financing FGEF projects are the GEF, sometimes in liaison with ICRAN (Costa Rica, Tanzania, Caribbean, Meso-America), governments (Costa Rica, Caribbean, Tanzania, Seychelles, Thailand) NGOs, including the WWF (5 projects: Meso-America, Mozambique, IOC, Thailand and South Pacific) and the IUCN (Tanzania and Thailand), Conservation International (South Pacific, and the IOC to a lesser extent). However, other agencies also contribute co-financing to projects supported by the FGEF, especially local NGOs (Seychelles), American foundations (Meso-America, South Pacific) and, finally, governments of other countries such as the USA (OPAAL in the Caribbean and SMMA at St Lucia). The Thailand project is also financially supported by scientific organisations: IRD and the University of Chulalongkorn, and the European Union through the CHARM project. The CRISP programme has a great many funding agencies including all the categories mentioned above.

FGEF financing is usually focused on some project activities or components that correspond to the facility's mission. However, in some cases, the FGEF has contributed small amounts of funding to components with majority financing from other agencies (such as the Meso-America project to which the FGEF contributed 19 000 € to the catchment basins component out of a total of 496 098 €), or for the development of the software application for financial analyses of MPA systems (Marfin), to which the FGEF contributed just 4000€. Such minority co-financing is justified only if the FGEF has adequate means to monitor the implementation of each component. As a general rule, it seems more relevant to concentrate FGEF grants on a smaller number of project activities or components.

CRISP

Financing for the CRISP programme is contributed by the AFD (3 M €), FGEF (2 M €), CI (1.2 M€), UNF (0.9 M €) and WWF (0.4 M €), with in addition the 2 M € recently contributed by the AFD to secure continuity and development of new project activities up to the end of 2009, making a total of 9.5 million €. Other funds have also been added (payment to the coordinator for 3 years, Pacific Fund for programme activities and project start-up, co-financing from partners, etc.). Total financing thus amounts to 14.4 million €. The project involves 15 financial partners, almost 50 technical partners directly involved in implementation, some 50 countries and territories, 39 MPAs, several networks (GCRMN, LMMA, Polynesia Mana, Sem Pacifika, etc.) and 3 regional organisations (SPC, SPREP and SOPAC).

(1) Not counting the Phoenix Island MPA, the world's largest (410 500 km²), created under the CRISP programme.

TABLE 5

Synopsis of institutional and financial arrangements to set up the projects analysed

Project title	SMMA Project	Narou Heuleuk Project	Mnazi Bay Project	Cocos Island Project	Quirimbas Project	CRISP Project	OPAAL Project	MAR Project	IOC NMPA Project	REI Project	Andaman Coast Project
	Protection and sustainable use of coral reefs – Lesser Antilles	Conservation of fisheries resources by fishing communities	Management planning for the Mnazi Bay Marine Park and Ruvuma Estuary	Biodiversity protection in the Cocos Island Marine Conservation Area	Development programme for the Quirimbas National Park	Contribution to the Regional Coral Reef Initiatives in the Pacific	Protected areas and benefit sharing in the Eastern Caribbean States	Conservation and sustainable use of coral reefs in the Meso-American eco-region	Network of marine protected areas in the IOC countries	Rehabilitation of island ecosystems: in several smaller islands in the Seychelles	Network of marine protected areas and sustainable tourism on the Andaman Coast
Country	St Lucia, Dominica, St Vincent, Grenadines	Senegal	Tanzania	Costa Rica	Mozambique	South Pacific 16 countries	Dominica and St Vincent the Grenadines St-Kitts and Nevis Antigua and Barbuda, St Lucia	Guatemala, Honduras	Seychelles, Mauritius, Madagascar, Comoros	Seychelles	Thailand
Focal area	Biodiversity	Biodiversity	Biodiversity and international waters	Biodiversity	Biodiversity	Biodiversity and international waters	Biodiversity	Biodiversity and international waters	Biodiversity and international waters	Biodiversity	Biodiversity
Promoting institution	MAEE	AFD	MAEE	MEDDM	AFD	MAEE -AFD	MAEE	MAEE	MAEE	MAEE	AFD
Project amount	410 000	13 400 000	2 353 070	3 524 500	5 265 000	10 400 000	6 100 000	2 790 793	1 944 000	1 368 000	13 750 000
Co-funding	Coop.France 120 000 USAID 50 000	AFD 11 300 000 MAEE-FSP 1 200 000	GEF/UNDP 1 424 213 GVT/UCN 298 857	GVT* 1 356 000 GEF/UNDP 975 000 Others 128 500	AFD 3 500 000 WWF 1 065 000	AFD 5 000 000 CI 1 250 000 WWF 400 000 MAEE 450 000 FP 400 000 UNF 900 000	GEF 2 960 000 OAE 280 000 OECS 336 800 Beneficiaries 96 000	WWF 923 000 ICRAN 690 598 SUMMIT 413 358 HENRY F. 13 687	MAEE 300 000 WWF 500 000 CI 444 000	GVT* 137 200 ICS 102 000 Sponsors 138 400 North Island 307 200 IDC 223 200 IRD 71 000	AFD 10 000 000 DNP 2 100 000 WWF 320 000 IUCN 22 000 IRD 71 000 CHARM/EU 222 000 Univ. of Chulalongkorn 15 000
FGEEF contribution	240 000	900 000	630 000	1 065 000	700 000	2 000 000	1 372 000	750 000	700 000	460 000	1 000 000
% of project	59	7	27	30	13	23	22	27	36	34	7
Beneficiary	Government (fisheries department)	Océanium NGO	Government (Ministry of Natural Resources and Tourism)	Government (Ministry of Environment and Tourism)	Government (Ministry of Tourism)	CI, WWF, FSPT, Prosciences, other NGOs, IRD, USP, CNRS, States, private enterprise, etc.	OECS	WWF	WWF-MOTI	ICS NGO	WWF
Project start-up	June 94	June 01	2003	Sept 03	June 04	Sept 04	Nov 04	March 05	Oct 05	Nov 04	Jan 07
Planned project duration	3 years	4 years	4 years	5 years	5 years	3 years + 2 years	5 years	3 years	3 years	4 years	3 years

* GVT : Government

Average distribution of FGEF grants across focal areas

Our analysis of the distribution of FGEF grants by focal area is based on the provisional budgets given in the project presentations⁽¹⁾. Moreover, the distribution only concerns FGEF grants and does not take into account the distribution of co-financing from other agencies (such as AFD financing for tourism in Thailand, community development and infrastructure at Quirimbas, fisheries management in Senegal, research under CRISP, etc.). The table below therefore does not show the overall distribution of project funding by focal area, but gives an idea of the way FGEF grants are usually allocated.

Of the 10 main types of activities financed by the FGEF (see table and diagram), those concerning "MPA creation, management and/or strengthening" account for the largest total amount (about 3 million €, or 31% of total financing on average). Next are "scientific studies and monitoring" (14.5%) followed by "project management and monitoring" (13.4%), which is therefore a major budget item in these projects.

The average budget allocation to awareness-raising and training amounts to over 1 million € (11% of the total budget on average) and concerns 9 of the 11 projects.

Financing for fisheries development activities

(4 projects) accounts for only 7% on average of the total FGEF budget (664 632 €). However, this average figure corresponds to very different situations in practice. In the SMMA project, for example, _ of the budget (construction of a jetty, a marketplace, FADs, training for fishermen, etc.) went to fishing.

The budget allotted to tourist development is the lowest overall (1.1% of the FGEF budget) and only concerns the Seychelles and Thailand. In combined AFD/FGEF projects, expenditures inherent to tourist development are usually covered by the AFD.

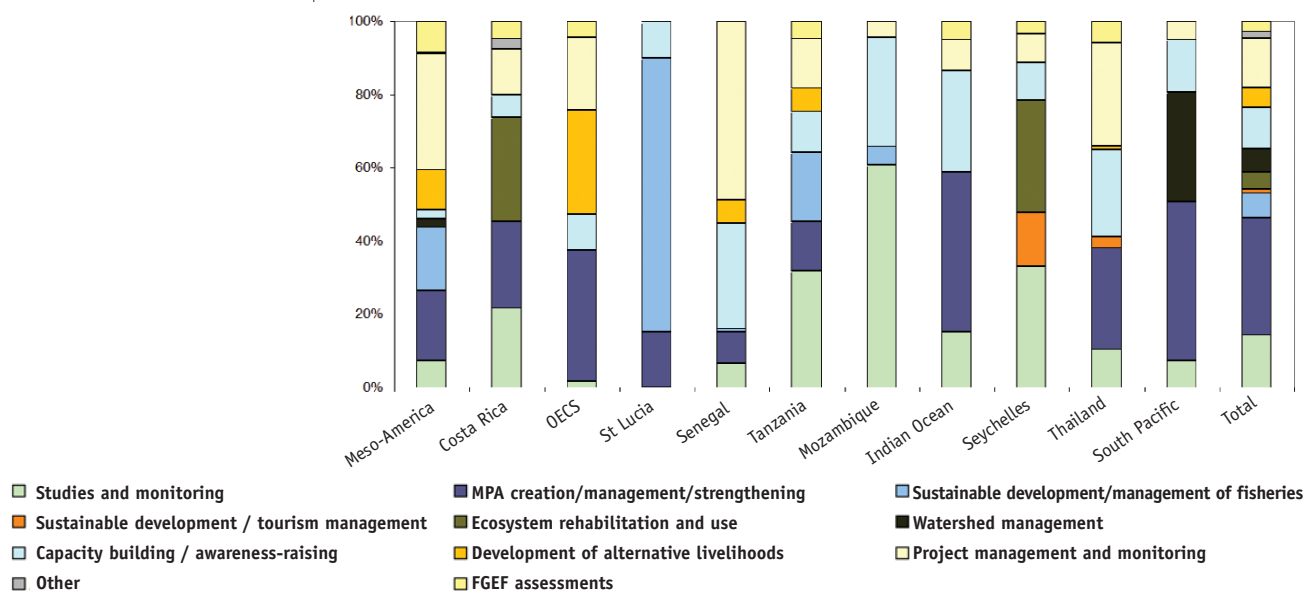
The budget for FGEF assessments amounts to 280 700 €, or 3% of total funding, and varies from 10 to 60 000 € depending on projects.

The "pollution - catchment basins" component is quite large at 619 000 €, or 6.3% of the total budget, but most of this is funding for the CRISP project, where this component is predominant. Although the FGEF contribution to this focal area may seem large in relative terms, it effectively concerns only 1 of the 11 projects assessed.

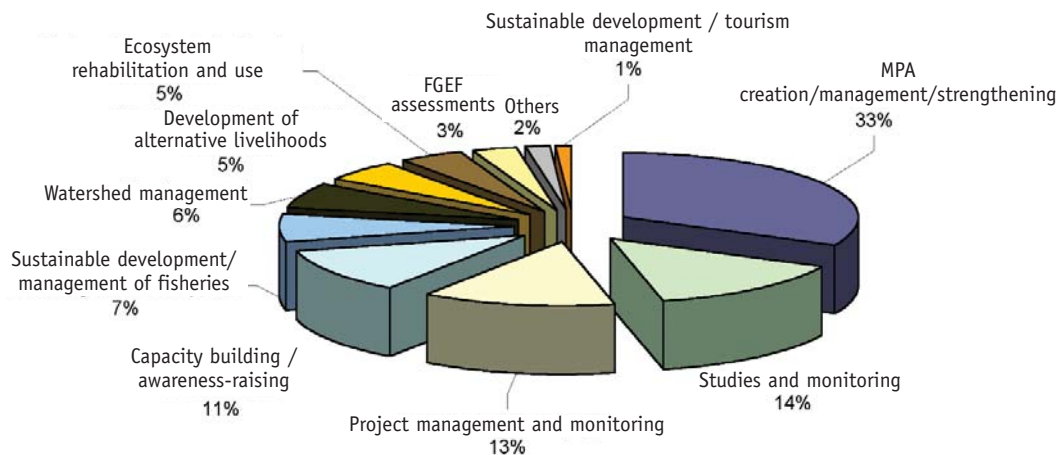
Apart from MPA creation, management and strengthening, larger amounts are allocated to scientific studies and project management than to field activities (fisheries, AL, etc.).

(1) This exercise would have proved of greater value if based on actual spending by project activities rather than on planned financing, but most of the projects have not yet been completed.

Distribution of FGEF grants by project component



Distribution of FGEF grants by project component



Project beneficiaries and project developers

Project beneficiaries are variable in our sample.

In the particular case of the 4 multicountry (regional) projects, project beneficiaries are of 2 types:

1 – Regional organisations

- Caribbean: implementation by the Organisation of Eastern Caribbean States (OECS) with one coordinator and one national project leader in each country,
- Indian Ocean: implementation by WWF Madagascar, under the aegis of the Indian Ocean Commission (IOC), with focal points in each country,
- CRISP project: one project coordinator attached to the Pacific Community Secretariat (PCS) and working with the officers responsible for components implemented by scientific organisations and NGOs.

2 – International NGOs

- Meso-America: WWF-Meso-America is the project instigator and project developer, with WWF correspondents in the 2 countries involved.

The State is the beneficiary in 4 projects (Costa Rica, St Lucia, Tanzania and Mozambique). Everywhere else, the project beneficiaries receiving FGEF financing are international NGOs (like WWF for 3 projects) and local NGOs, like Océanium (Senegal) and ICS (Seychelles).

When projects are promoted by governments (which often have limited capacities in terms of human resources and skills), technical assistance is provided to support project management and strengthen skills. This is the case in Tanzania, where technical assistance was initially provided by the IUCN, in Mozambique where technical assistance is provided by the WWF, in St Lucia, for the IOC project and for the CRISP project in the South Pacific, where technical assistance was provided by the French Ministry of Foreign Affairs (for the CRISP project with co-financing from the Pacific Fund, with the AFD taking over when MAEE funds were exhausted).

Role of the FGEF

The FGEF's primary role has been to provide additional co-financing for projects, while sometimes helping them towards maturity. This was aided via contributions from the scientific and technical committee, through the feasibility studies required by the steering committee, and with support from the secretariat.

Insofar as it has been invited to do so by project beneficiaries, the FGEF has always sought a partnership role, contributing to discussions, technical advice and assessments and thus extending its role beyond that of a funding agency alone.

However, the FGEF sometimes has difficulty in doing so, as project beneficiaries are not always open to such extended partnerships. This was the case with the Mnazi Bay project (Tanzania), where despite supervisory field missions, the FGEF association to project advancement and the integration of its recommendations were limited.

Nevertheless, in most cases the FGEF plays a useful role in project implementation due to its flexibility and adaptability with regard to problems arising during implementation. This is the case, for example, with project execution schedules, which are often extended beyond the initial deadlines to adapt to the numerous unforeseen constraints or needs that arise.

Description of the MPAs

Of the 70 MPAs concerned by FGEF projects, 23 already existed and were strengthened, 33 were created through the projects and 14 are in the process of creation or pending.



The Bamboung MPA - Senegal (© T. Clément)

MPA creation dates

The oldest MPAs are those in the Seychelles, dating back to the 1970s (Sainte-Anne, Aride, Cousin and Curieuse). Since then, more MPAs have been created on a fairly regular basis up to now (Nosy Hara MPA in Madagascar in 2008).

The table below shows creation dates for the main MPAs included in the projects analysed here.

TABLE 6
Creation dates of the main MPAs analysed for this study

Country	MPA	Creation date	Country	MPA	Creation date
Seychelles	Ste Anne	1973	Honduras	Cayos Cochinos	2003
Seychelles	Aride	1973	Senegal	Bamboung	2004
Seychelles	Cousin	1975	French Polynesia	Moorea	2004
Seychelles	Curieuse	1979	Antigua & Barbuda	NEMMA	2005
Thailand	Surin	1981	Madagascar	Velondriake	2005
	Similan	1982	Guatemala	Punta de Manabique	1989/2005
	Lantah	1983	Rodrigues	Rivière Banane	2007
Dominica	Cabrits national park	1986	Madagascar	Nosy Hara	2008
Honduras	Cuero y Salado	1987	St Lucia	Pointe Sables National Park	Pending
St Lucia	SMMA	1995	Senegal	Cap Manuel	Pending
Madagascar	Nosy Tanikely	1995	Senegal	Casamance	Pending
St Vincent and the Grenadines	Tobago Cays marine park	1997	Senegal	Nyanning	Pending
Tanzania	Mnazi Bay	2000	New Caledonia	Yambé et Diaouhé	Pending
Mauritius	Balaclava	2000	New Caledonia	Lindéralique Hienghène	Pending
Samoa	Aleipata	2000	Solomon	Sand Fly	Pending
	Safata	2000			
Comoros	Mohéli	2001			
Mozambique	Quirimbas	2002			
Costa Rica	Cocos Island	1978/2002			

Regulatory context

All the countries with GEF projects have ratified the Convention on Biological Diversity (CBD) as well as the Regional Seas conventions⁽¹⁾. In the Meso-America project, for example, management of protected area networks is clearly consistent with the national biodiversity strategy, which applies CBD provisions.

All the countries have national legislation on protected areas and fishing activities, but few have specific legislation on MPAs (Tanzania only). Several countries (Meso-American and East African regions, Madagascar, Comoros and the Pacific) have included local authority or community management of natural resources in their decentralisation policies.

Policies for protecting the marine environment are voluntary in some countries (e.g. Costa Rica, Tanzania, Mozambique, Seychelles, Madagascar and the French overseas territories in the Pacific), but elsewhere, MPA creation is more a matter of lobbying by NGOs or other groups than an expression of real political will. Most of the countries have a weak institutional context (lack of human and financial resources).

- For example, the government in **Costa Rica** is developing a voluntary policy for protection and sustainable management of its natural resources based on eco-development principles, while in **Guatemala** and **Honduras**, the institutional context is weaker and NGOs have a stronger role. In these 3 countries, the government delegates protected area management to public organisations, foundations or NGOs. In the last 10 years, Guatemala and Honduras have been developing decentralisation processes, with the creation of community development councils in Guatemala or inter-municipal communities in Honduras.

- In the **Caribbean**, efforts made by the OECS member states to implement effective biodiversity conservation measures have had limited impacts due to inadequate national legislation, insufficient human resources, lack of knowledge of the natural heritage and low support for nature protection in public opinion. The OPAAL project strongly supported the OECS Environment and Sustainable Development Unit in an exhaustive review of the legislative framework in its member states and in proposing frameworks for the development of protected area networks in each one. Numerous training sessions were also organised for local cadres in the member states (essentially with GEF/World Bank co-financing for the OPAAL project).

- **Senegal** has various items of legislation on MPAs but the state is lacking in resources and plagued by ambiguity as to the respective roles of the ministry for fisheries and the ministry for the environment in terms of prerogatives over the creation and management of these protected areas.

- In **East Africa**, conservation policies are clearly consistent with tourist development orientations. In Tanzania, the Marine Parks Act (contrary to the act on national parks on land) specifically prescribes consideration of local populations in planning, managing and equipping marine parks. However, the ministry has only limited resources. In Mozambique, environmental policy and the organisation of responsibilities within the government clearly reflect the national will to consider nature conservation as a factor driving development, through the tourist sector. The Ministry of Tourism is also responsible for protected areas.

- In **Thailand**, legislation on national parks dates back to 1961, but contradicts the Constitution of 1997. Numerous institutional and legislative reforms are in the pipeline,

(1)Cartagena Convention (Caribbean and Western Meso-America), Antigua Convention (Eastern Meso-America), Abidjan Convention (Senegal), Nairobi Convention (East Africa and Indian Ocean) Apia and SPREP Conventions (Pacific)



Oyster farming training session, Casamance's MPA (© Océanium)

given the many items of environmental and natural resources legislation. The government has adopted a conservation policy and two national biodiversity strategies (1998-2002 and 2003-2007) under the CBD framework. The difficulties facing biodiversity protection have less to do with a lack of legislation and protected areas than with the country's inadequate capacities for enforcing existing provisions (non-integration of biodiversity in overall development and poverty reduction objectives, lack of harmonisation between numerous items of legislation, coastal zone responsibilities split between different authorities and inadequate budget resources).

Most of the countries therefore have a legislative context which is favourable to MPA creation, even though virtually none of them have specific legislation on MPAs. Political will and capacities seem to be the key factors affecting MPA development. A number of currently functioning MPAs have been established in countries that did not necessarily have an ideal legal framework (the SMMA in St Lucia, Tobago Cays Marine Park in Saint Vincent and the Grenadines, Bamboung community MPA in Senegal). The existence of an appropriate legal framework nevertheless strengthens the process, and especially the process of achieving MPA self-sufficiency.

TABLE 7

Status categories of the main MPAs covered by the projects analysed

Status	MPA	IUCN category
Community MPAs	Cap Manuel	VI
	Casamance	VI
	Nyanning	VI
	Bamboung	II
	Yambé and Diaouhé	VI
	Aleipata	VI
	Safata	VI
	6 MPAs in Efate Nord and Mystery Island (Vanuatu)	VI
	3 MPAs in Marau (Solomon)	VI
	Sand Fly (Solomon)	VI
Planning zones	Moorea MPA	IV or VI
	SMMA	VI
	North East Marine Management Area	IV
National Parks	Tobago Cays Marine Park	IV
	Mnazi Bay	II
	Quirimbas	II
	Pointe Sables	II
	Cocos Island	II
	Cabrits	II
	Mohéli	II
	Surin, Similan, Lantah	II
Natural Marine Monument	Cayos Cochinos	V
Wildlife refuge	Punta de Manabique	IV
	Cuero y Salado	IV
Special reserve	Cousin Island	Ia

Ia: Strict nature reserve: protected area managed mainly for scientific purposes or to protect wildlife resources;

II: National Park: protected area managed mainly for ecosystem conservation and recreation.

IV: Habitat / species management area: protected area managed mainly for conservation through management intervention;

V: Protected landscape

VI: Managed resource protected area: protected area managed mainly for the sustainable use of natural ecosystems.

Status of MPAs

The status of the MPAs supported by these projects are very dependent on national legislation in each country, and is usually a marine version of the legislation for wildlife refuges on land, for example, rather than a specific marine status.

The MPAs in these projects fall into three main categories:

- those with a classic status as a national park (marine only, or land and marine) or reserve, with several versions according to type (wildlife refuge, special reserve),
- community MPAs, with or without official status,
- marine management areas.

MPAs are mainly in the IUCN categories VI (Protected area with sustainable use of natural resources) and II (National Park). Apart from their status, it seems that few MPAs are strictly dedicated to biodiversity protection but that most fulfil a dual protective and development purpose.

In Senegal, due to the unclear distribution of roles between the Ministry of the Environment in charge of protected areas on land and the Ministry of Fisheries in charge of protecting fisheries resources, MPAs have been created directly by presidential decree. Although this solution has provided a legal framework for 5 Senegalese MPAs and overcome the weaknesses of the existing legal framework, it was ultimately counterproductive in the sense that since the first 5 protected areas were listed, there have been no further procedures for other protected areas because of the complexity of the process involved.

Areas covered by the MPAs

Apart from the Phoenix Island MPA, the world's largest at 410 500 km², created with CRISP support, the extent of protected areas (on land and sea) ranges from 7506 km² in the Quirimbas National Park to 0.2 km² at Pointe Sables, and sometimes even less in the case of some community MPAs in the Pacific created under the CRISP programme.

In terms of the marine area alone, the MPA covering the largest area is the Cocos Island National Park in Costa Rica (1947 km²), followed by the Quirimbas National Park in Mozambique (1522 km²), the Nosy Hara Marine Park in Madagascar (1409 km²) and Punta de Manabique in Guatemala (1026 km²). The great majority of the other MPAs cover a marine area ranging from 40 to 400 km². Based on the average dispersal of benthic organism propagules (around 10 km), several

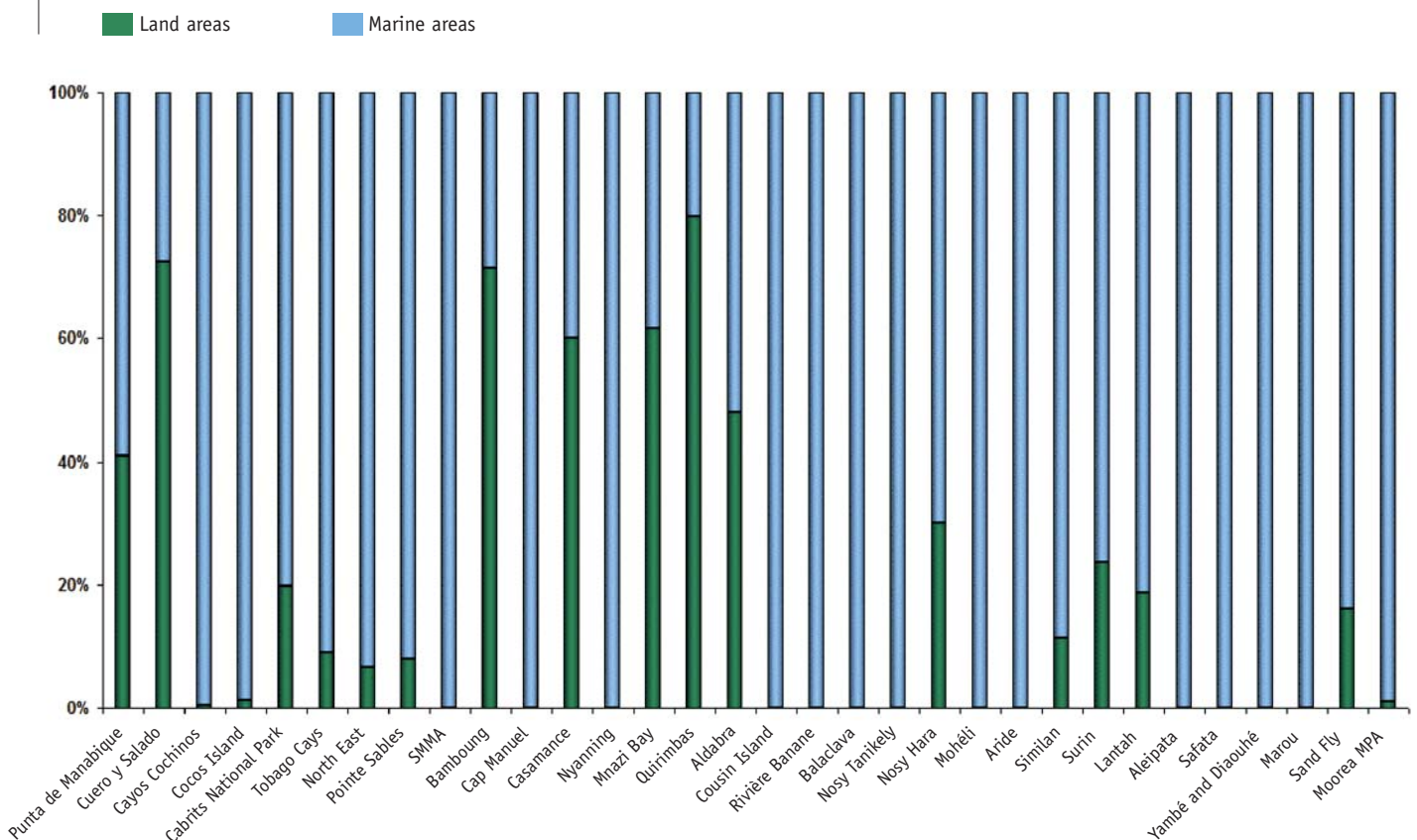
studies recommend MPAs 10 to 20 km in diameter (i.e. about 500 km²), 10 to 20 km distant from each other and located in areas with highly diverse habitats including zones vital to the life cycle of species (Mora et al, 2006⁽¹⁾).

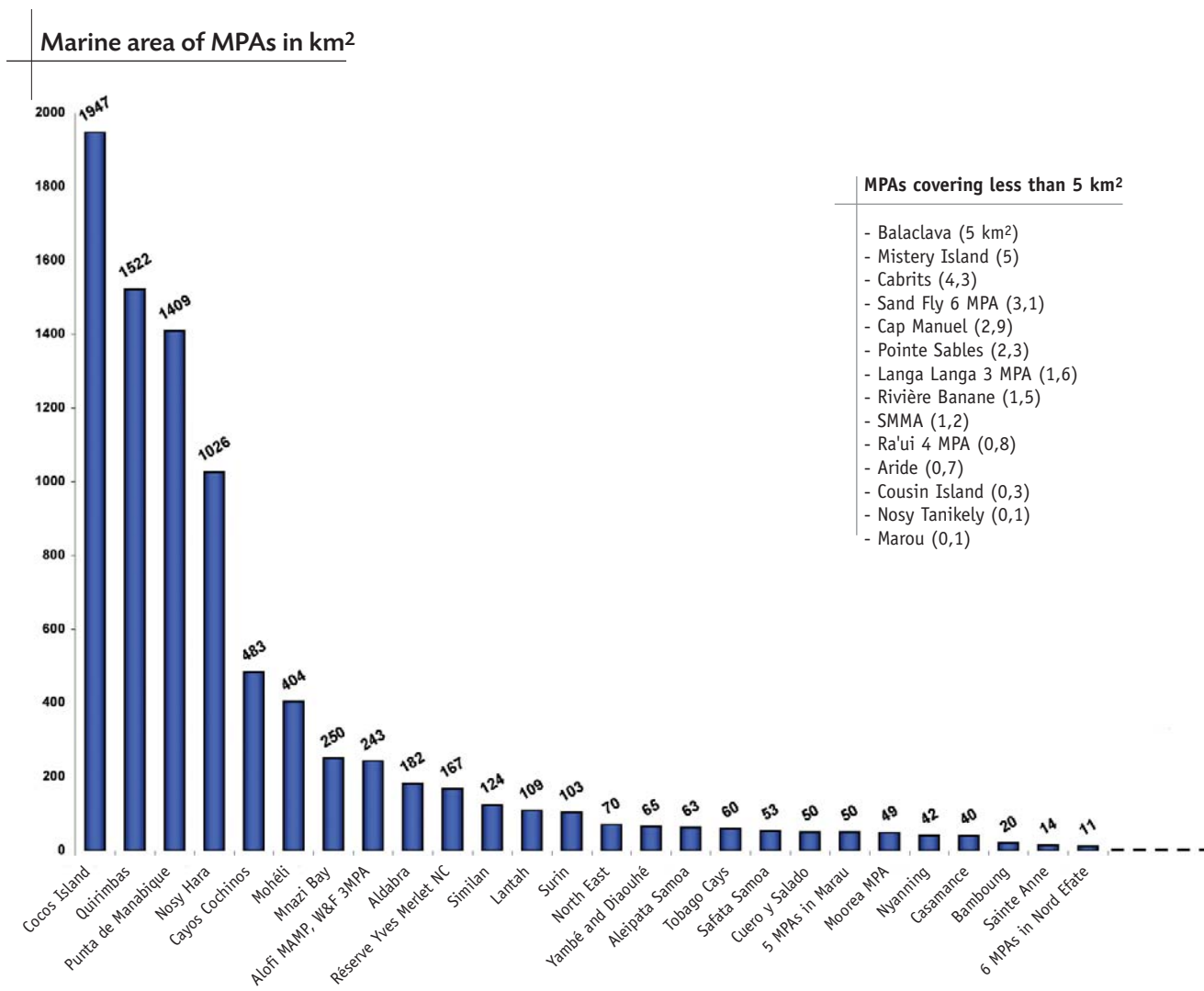
Apart from small island MPAs that cover an entire island, of the 21 MPAs considered, 12 have both land and marine areas, with land areas often much larger than marine areas. The largest land areas proportional to marine areas are in the Cuero y Salado MPA (Honduras), the Bamboung and Casamance MPAs (Senegal) and the National Parks in Mnazi Bay (Tanzania) and the Quirimbas (Mozambique).

Our sample also includes 12 exclusively marine MPAs, the largest being the Mohéli marine park in the Comoros.

(1) Mora et al, 2006*. Coral Reefs and the Global Network of Marine Protected Areas, Science vol. 312 23.

Proportion of land and marine areas in the MPAs





MPAs covering less than 5 km²

- Balaclava (5 km²)
- Mistery Island (5)
- Cabrits (4,3)
- Sand Fly 6 MPA (3,1)
- Cap Manuel (2,9)
- Pointe Sables (2,3)
- Langa Langa 3 MPA (1,6)
- Rivière Banane (1,5)
- SMMA (1,2)
- Ra'ui 4 MPA (0,8)
- Aride (0,7)
- Cousin Island (0,3)
- Nosy Tanikely (0,1)
- Marou (0,1)

Context of the MPAs

Population

Population pressure in and around MPAs is highly variable. Some MPAs are uninhabited and very remote, such as the Cocos Island National Park or the Aldabra strict nature reserve in the Seychelles. Other MPAs may have tens of thousands of inhabitants, such as the national parks in the Quirimbas (94 000) and Mnazi Bay (30 000), which have the largest populations in our sample.

In terms of MPA area, population density is an indicator of the pressure exerted on the MPA's environment and resources (see table 8 below). The SMMA and Pointe Sables protected areas (St Lucia) and those at Bamboung and Nyanning (Senegal) have the highest population density. The South Pacific MPAs have a relatively large population given their small size (100 to 500 inhabitants on average), with

protected areas often covering less than 5 km² and sometimes just a few hectares.

In some MPAs, the population fluctuates with the seasons, as in Cayos Cochinos where the population varies from 100 to 300 over the course of the year.



Ibo vegetable garden's village group, Quirimbas (© C. Gabrié)

TABLE 8

Examples of population density in or around the MPAs analysed

Region	Country	MPA	Protected area (km ²)	Country pop. density (inhab/km ²)	Population in or around protected area	Number of communities (or villages)	Pop. density in protected area (inhab/km ²)	
Meso-America	Guatemala	Punta de Manabique	1026	119	2 278	17	2	
	Honduras	Cuero y Salado	50	57	108 / 300	7	0	
		Cayos Cochinos	483					
	Costa Rica	Cocos island	1947		0	0	0	
Caribbean	Dominica	Cabrits	4.26	91				
	St Vincent & the Grenadines	Tobago Cays	60	303	A few hundred	1	3	
	Antigua & Barbuda	NEMMA	70	186	Several thousand	20	29	
	St Lucia	Pointe Sables	2.3	260	Other a thousand	7	652	
	St Lucia	SMMA	1.2	260	6 000	1	5000	
Africa	Senegal	Bamboung	20	59	15 000 nearby	14	750	
		Cap Manuel				Dakar		
		Casamance	40		5 000	10	125	
		Nyanning	42		30 000	4	714	
	Tanzania	Mnazi Bay	250	41.7	30 000	17	120	
	Mozambique	Quirimbas	1522	23.8	94 000 (some 20 000 on the coast)		13	
Indian Ocean Commission	Seychelles	Aldabra	182	178	0	0	0	
		Rodrigues	Rivière Banane	1.5	349			
	Mauritius	Balaclava	5	633				
	Madagascar	Nosy Tanikely	0.1	27				
	Comoros	Mohéli	404	339		10		
South Pacific	Samoa	Aleipata	63	60	300	11	5	
	Samoa	Safata	53	60	300	9	6	
	New Caledonia	Yambé et Diaouhé	65	11	300		5	
	Vanuatu	Marou	50	14	100		2	
	Solomon	Sand Fly	3.1	20	500	15	161	
	French Polynesia	Moorea MPA	49		17 000		347	

Tourism

Tourist activity varies widely between the different MPAs studied: those in Thailand, Moorea, St Lucia and St Vincent and the Grenadines receive around 100 000 visitors per year. The Quirimbas and Cocos Island National Parks and the Bamboung community MPA receive 2 to 3 000 per year. The MPAs in Meso-America and Tanzania receive fewer than 1 000 visitors per year and some South Pacific MPAs have none at all (e.g. Langa Langa in the Solomon Islands).

Tourist activity varies widely between the different MPAs studied

In the Caribbean, the SMMA at St Lucia is in one of the region's most renowned and popular sites (70% of foreign visitors to St Lucia go to Soufrière, according to Ministry of Tourism figures). An estimated 500 000 people visit the MPA each year, although the exact figure is not known. The Tobago Cays site at St Vincent and the Grenadines also

receives large numbers of tourists throughout the year.

Despite its distance from the coast (over 600 km), Cocos Island attracts large numbers of tourists. Tourism is focussed mainly on scuba diving but the island is also popular with yachtsmen. It currently receives about 2 800 visitors a year.

In Mozambique, the Quirimbas islands are gaining an international reputation. At present, three of the islands have tourist facilities (Ibo, Matemo and Quilalea), along with Guludo on the Mozambique coast. Current hotel capacity is 142 beds, ranging from luxury accommodation to mid or low range and community tourism. In 2006, 3300 tourists visited the park (Park estimation).

On the other hand, there is virtually no tourism in Tanzania's Mnazi Bay Park region, which is off the tourist track.

In Senegal, the zone where the Bamboung MPA is located is a nature tourism site, with nearby Toubacouta offering a few hundred hotel beds.

In the IOC region, tourism differs widely between countries: it is relatively undeveloped in the Comoros, which receive only 27 000 visitors a year, while Mauritius hosts 800 000 - 900 000 tourists a year or 200 000 visitors go to visit Seychelles each year. Several MPAs are still off the beaten track, for example Mohéli in the Comoros and in Madagascar and Rodrigues (Mauritius). On the other hand, the Seychelles economy is based on tourism and fishing, which are the country's two main currency earning sectors. At present, tourism contributes almost 40% of the country's foreign currency earnings, and fishing 54%.

In Thailand, parks are under considerable tourist pressure, justifying the new FGEF project in the country.



Cowries collected in the Quirimbas (© C. Gabrié)

Fishing

Populations in virtually all of the FGEF/AFD project countries are highly dependent on fish resources. Most people fish, and the populations are mainly farming and fishing communities: in the South Pacific, it is estimated that 90% of animal protein in the local diet is of marine origin (although the share of poultry is increasing). In Mozambique, dependence on fish resources is among the highest (80% of households). In Tanzania, 63 to 74% of families in coastal villages depend on marine resources (Malleret, 2004⁽¹⁾). In the Meso-American region, fishing is the primary source of community income for 65% of households in Punta de Manabique, 30% in the Cayos Cochinos archipelago and 21% at Cuero y Salado. In Senegal, in the last few years, fishing has become the economy's largest primary sector, with catches of 330 000 tonnes a year, including 85% from small-scale fisheries (in 2000 - Senegal Fisheries Economy Observatory).

Populations in virtually all of the FGEF/AFD project countries are highly dependent on fish resources

Even in MPAs where few people are directly dependent on fishing (SMMA, Tobago Cays, etc.), the minority of the population that does depend on fishing is the poorest and as such deserves particular attention in MPA projects.

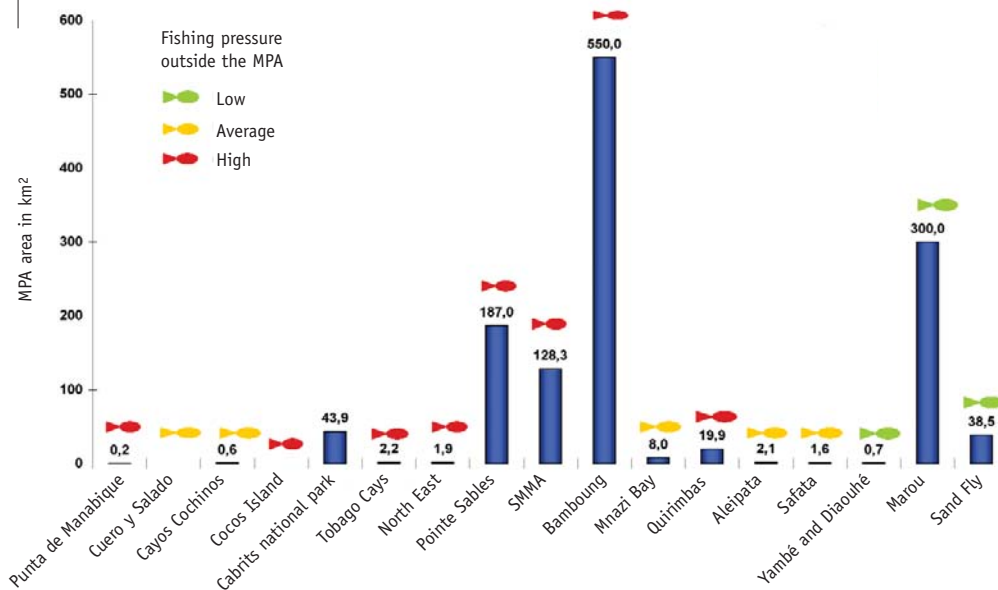
An approximation of fishing pressure in each marine area may be made by dividing the number of fishermen by the area of protected marine zone. However, a more exact estimation of fishing pressure requires analyses of actual catches per fisherman, by assessing the catch per unit effort.

TABLE 9

Fishing density in the MPAs

	Marine sector of MPAs in km ²	Number of people fishing in the MPAs	Fishing density (number of people fishing in the MPA/marine area)	Fishing pressure from outside the MPA 1: low 2: average 3: high
Punta de Manabique (Guatemala)	1026	229	0.2	3
Cuero y Salado (Honduras)	50	ND	ND	2
Cayos Cochinos (Honduras)	483	283	0.6	2
Cocos Island (Costa Rica)	19.47	ND	ND	3
Cabrits (Dominica)	4.26	187	43.9	?
Tobago Cays Marine Park (St Vincent & Grenadines)	60	129	2.2	3
North East Marine Management Area (Antigua & Barbuda)	70	132	1.9	3
Pointe Sables (St Lucia)	2.3	430	187.0	3
SMMA (St Lucia)	1.2	154	128.3	3
Bamboung (Senegal)	20	11 000	550.0	3
Mnazi Bay (Tanzania)	250	2 000	8.0	2
Quirimbas (Mozambique)	1522	30 250	19.9	3
Aleipata (Samoa)	47	100	2.1	2
Safata (Samoa)	63	100	1.6	2
Yambé and Diaouhé (NC)	67	50	0.7	1
Marou (Vanuatu)	0.1	30	300.0	1
Sand Fly (Solomon Islands)	2.6	100	38.5	1

Fishers density (number of fishermen per square km of MPA)



In the Pacific Islands, it is difficult to estimate the number of people who fish as it is a subsistence or leisure activity for a large majority of the population. The figure is significant and has to be added to the number of registered professional fishermen.

It is estimated that about 11 000 people fish in the Bamboung MPA zone in Senegal, and that about 1 100 fishing units are active in the project zone. It is very difficult to make an exact estimation of the actual number, as fishermen travel a great deal down the entire West African coast. The figure given here therefore probably needs to be weighted to account for periods when active fishermen are away.

In addition to local people fishing in the zone, others from neighbouring villages or migrant fishermen (Senegal, Mozambique, Meso-America) add to fishing pressure. At Punta de Manabique for example, about 230 people fish in the MPA, or 0.2 per km² (the lowest ratio of all the MPAs analysed), but about 2 500 people from the neighbouring village also use the reserve, which considerably increases fishing pressure. This is also the case in Mnazi Bay (Tanzania) and many other MPAs.

(1) Malleret, D. 2004. A Socio-economic Baseline Assessment of the Mnazi Bay - Ruvuma Estuary Marine Park. Submitted to IUCN 102+46 pp.

Costs of the MPAs

Table 10 gives available information or estimations determined for MPA operating costs. These are actual costs or estimations of costs to balance accounts.

The table shows that costs per km² are higher for small MPAs. Various unavoidable expenses limit potential economies of scale in unit costs. Size is obviously not the only factor: the level of management sophistication is also very important, especially as regards surveillance costs which can be very high in sparsely populated MPAs (e.g. SMMA). However, these results must not lead to the conclusion that only large MPAs should be encouraged. Realities on the ground must obviously be given priority in establishing MPA boundaries and the budgets required to ensure their effectiveness.

Finally, community MPAs where local populations are often responsible for surveillance (e.g. Bamboung, Aleipata and Safata or Sand Fly) are usually less costly per km² than institutionally managed MPAs.

TABLE 10

Estimated operating costs for selected MPAs

Name of MPA	Actual or estimated operating budget in €/ year	Area (km ²)	Costs / km ²
SMMA	175 000	11	15 909
Marou (Vanuatu)	1 000	0.2	5 000
Tobago Cays	150 000	66	2 273
Bamboung	150 000	70	2 143
Cayos Cochinos	500 000	485	1 031
Mnazi Bay	200 000	650	308
Sand Fly (Solomon)	10 000	72	139
Aleipata – Safata	10 000	116	86
Quirimbas	500 000	7506	67

Summary and main conclusions of the lessons learned

Within this chapter :

Main results P.30

Project successes and pointers for progress P.34



Cayos Cochinos marine park, Honduras (© C. Gabrié)

Main results

The success of MPAs is very dependent on the context in which projects are identified and implemented. The contexts, implementation phases (see “compass card” monitoring method in Appendix 4) and results obtained vary widely between projects.

Based on the following criteria, (1) overall acceptance of the MPA by populations, (2) proper observance of management rules, (3) implementation of the management plan, (4) development of activities within the MPA, (5) positive effects of no-fishing zones (6) success of alternative livelihoods (AL), it may be considered that the following MPAs have been successful to date, even though they are not yet entirely self-sufficient and their impact on biodiversity has yet to be confirmed by long-term monitoring:

- the Cayos Cochinos MPA in Honduras,
- the Soufrière Marine Management Area (SMMA) in St Lucia,
- the Bamboung community MPA (Senegal)
- The Quirimbas National Park (Mozambique).

- In the **MAR** project in the Meso-American region, MPAs already existed well before the project, in a context of institutional weakness and insufficient political will but within the framework of regional strategies essentially promoted by NGOs. The MAR project followed an earlier regional programme promoted by the World Bank, which had already laid robust foundations for scientific, technical and partnership aspects and developed regional strategies. The FGEF project was the first to address practical activities stemming from the WWF’s new regional Meso-American Reef programme.



(© A. Medina)

The contexts of the three MPAs in the project are very different: one, Cuero y Salado, has very few human and financial

resources; one was making good progress but was weakened by the departure of its director (and both were being undermined by heavy drug trafficking within their boundaries), and one, Cayos Cochinos, was already well established with substantial external financing and support.

However, the inadequate human resources allotted to the project management unit caused delays and the alternative livelihoods developed did not provide strong enough economic substitutes to significantly increase standards of living among populations, or to reduce fishing pressure.

However, this project has achieved some major successes:

- support to government gap analyses on the CBD protected area networks of the 2 countries and in the MPA network (on commercial species);
- development of the Marfin tool, which facilitates financial management of protected area networks, and its adoption by government officials;
- development of ecosystem monitoring systems that provide a sound basis for monitoring fishing impacts;
- strategic alliances with the agro-industrial sector (lobster fishing and fish farms, to establish more sustainable fishing or fish farming) are also a major victory for the WWF, which provides a sound basis to foster change in practices that are often still very destructive or damaging to the environment.

● **The Cocos Island National Park (CINP)** has developed remarkably in the last 3 years in terms of resources, management efficiency and park facilities, but also in terms of scientific knowledge on the site. The CINP is very probably Costa Rica's most advanced and most highly developed marine park and could serve as an example for other marine parks in the country. However, as the project moves into its final year, the park will have to deal with major challenges in the years to come, including the problem of illegal fishing.

Illegal fishing is still very widespread and it seems that it is not diminishing despite the strengthened surveillance which is undoubtedly one of the project's main successes. The purchase, with FGEF financing, of the "Coco Patrol 1", a powerful ocean-going motor torpedo boat, should greatly improve surveillance within the CINP.

Increased knowledge on the distribution of the island's marine habitats, species and coral reefs has brought considerable progress, and studies have been very successful although they are not yet complete. However, the park still needs to

develop plans for monitoring biodiversity and the impacts of the protected area (there is as yet no formal benchmark study on the status of the park environment that can irrefutably demonstrate the impacts of the protective measures implemented). When the national park was created in 1978, no in-depth studies had been made on the pre-project situation. Since then, and especially in the last 10 years, scientific data gathering has continued to gradually build up the basis for a benchmark study.

While activities to eradicate exotic plant species (coffee, fruit trees, hibiscus, lianas, etc.) and restore plant ecosystems have progressed rapidly, little has been done in practice to eradicate or control invasive animal species likely to damage the integrity of the park's ecosystems and endemic species.

● **The Soufrière MPA (St Lucia)** was created to address two main issues:

- conflicts between traditional users (for fishing) and new arrivals in the tourist sector (hoteliers, divers and yachtsmen);
- declining biodiversity and coastal fishing resources.

The project, initially supported by French cooperation and then by the FGEF, has been an all-round success and has become an international reference in terms of impacts on biodiversity, economic benefits for fishing communities, job creation, financial sustainability and coverage of recurrent costs, local involvement, institutional capacities and regulations.

Although the initial project could not reasonably include the catchment area in the MPA, it has become clear that this is now endangering the MPA due to tourist development and resulting pollution, erosion and sedimentation. Failing significant intervention in the catchment area, the MPA will be at considerable risk in the medium term.

The other MPAs planned in the project have not emerged for lack of political will among the governments of St-Vincent and the Grenadines, Dominica and Grenada to take the legal measures required to launch the project (creation of a project coordination unit, official listing of sites for protection and creation of a fund to ensure long-term financing of MPA activities).

● **The OPAAL project (Caribbean)** had made little progress at the time of the mid-term assessment, as the institutional project set-up (at regional, national and MPA levels) and prior studies had taken far more time than expected. Most of those involved in the field were clamouring for practical activities to begin.

Factors of MPA success

According to a study in the Philippines (Pollnac and Crawford, 2000) on 45 community MPAs in the Visayas region, the factors of success of MPAs are:

- a relatively small population;
- perceptions of a "crisis situation" reflected in a decline in fish populations before the protected area is established;
- success with alternative livelihoods;
- a relatively high level of community involvement in decision-making;
- ongoing support from the organisations that initially established the MPA.

**Pollnac R., Crawford B., 2000. Discovering factors that influence the success of community based marine protected areas in the Visayas, Philippines. CRC report, Rhodes Island : 30p.*

Of the 4 MPAs supported by the project (plus 2 protected areas in catchment areas on land), only the Tobago Cays MPA had effectively begun to operate in practice.

In this case, the FGEF was supplying co-financing for a GEF project. In order to abide by international recommendations on aid effectiveness, the FGEF agreed, for the sake of simplification, to harmonise its financial management procedures by adopting those set out in the guide to procedures published by the World Bank, the executing agency for GEF resources. This solution turned out to be inappropriate, as experience showed that World Bank procedures were extremely cumbersome and sometimes ill-suited to the context of the small Caribbean islands. As a result, the project did not benefit from the flexibility offered by FGEF funding implementation.

- In Senegal, the **Narou Heuleuk** project has been a success despite difficulties over the publication of the decrees needed to create the MPAs. The project first applied highly innovative methods to raise awareness among populations, such as travelling film sessions with discussions in coastal fishing villages. These were open-air film projections on local marine issues, produced in the local language and followed by discussions with the audience.

The project consistently sought to innovate, especially in developing alternative livelihoods that were systematically custom-designed to take advantage of the specific opportunities of each site and to cover - at least in part - the operating costs of the MPA. All of these ALs aim to finance the costs of MPA surveillance by eco-rangers, who start off as volunteers.



Ranger's watchtower within the Bamboung MPA (©T. Clément)

This led to the creation of an eco-tourist camp in the Bamboung community MPA, from which some of the income is used to finance the costs of patrols.

The project also measured the effects of the MPA thanks to a research programme conducted by the IRD, which is still proving very useful to demonstrate the effects of the MPA.

This project would be a complete success if it had not encountered difficulties with the authorities in obtaining official recognition for 4 of the 5 MPAs launched. However these are still going ahead through projects initiated by Océanium.

- The MPA at **Mnazi Bay** in Tanzania had already been recently established, but despite local community validation of the decision to create it, some villages were very reticent, partly because of a number of unfulfilled promises but also because of political differences. Reluctance increased during the course of the project, turning into outright hostility and rejection of the MPA and its rules.

The weak institutional context and management unit, mainly a result of inadequate technical support at the start of the project, proved unable to remedy the situation, especially as the management bodies could not rely on local NGOs that could have effectively relayed the programme. Moreover, administrative and financial difficulties in managing the project, which was co-financed with the UNDP, caused considerable delay. Despite all this and despite the mediocre results of some activities (ALs and substitution of destructive fishing gear), most of the planned project activities were carried out and significant gains were made in scientific knowledge.

- In the **Quirimbas** National Park project, there were several factors of success from the outset: a favourable legislative environment, the political will to make the conservation sector a driving force of the economy, the determination of the local communities who



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had demanded the park's creation themselves as a way of reducing conflicts with migrant fishermen and halting the decline in their resources, robust technical support for the management unit and well-coordinated partnership between co-funding agencies. Results of significant importance have been obtained, including the creation of fisheries committees and their involvement in management and surveillance, alternative livelihoods (AL), no-fishing zones that have already proved their effectiveness, fisheries monitoring and tourist development.

● **The CRISP programme** has produced a great many results in its first three years.

Component 1 on "MPA and catchment basins" has established or supported 39 MPAs (including the world's largest) covering a total of 411 138 Km² (1) in 7 countries and 3 French overseas areas. It also produced an eco-regional analysis for New Caledonia that was used to support the request to designate New Caledonia's lagoons as a UNESCO World Heritage site. The programme was handicapped at the start because of the problematical launch of the "catchment basins" part of the component. However, the content of the preparatory studies for MPA implementation offers little or no possibility for reliable measurements of their economic effectiveness once the programme comes to an end or in the medium term.

Component 2A on "acquiring and using knowledge for coral ecosystem management" produced interesting studies on the post-larval stages of fish and invertebrates that have provided a better understanding of recruitment. However, the other activities in component 2A have not yet produced workable tools and management methods for coral ecosystems that can be used by MPA management bodies.

Component 2B on "reef restoration" was an opportunity for fruitful cooperation with a GEF programme (Coral Reef Targeted Research - CRTR) working in fairly similar topics and territories, to publish a common guide on reef restoration techniques based on work carried out in several different sites.

The bio-prospecting studies under component 2C on "potentially valuable active marine substances" was able to include some much appreciated legal support to the countries concerned, as well as a great many student exchanges. Samples collected in the Solomon Islands and Vanuatu and their initial analyses confirmed the hopes placed in these studies, in particular regarding treatments for inflammation, cancer and malaria.



"Turtle museum" in Matemo, Quirimbas (© C. Corbier)

Component 2D on "establishing a regional database" was delayed for one year due to the particularly lengthy process involved in signing the convention. It nevertheless succeeded in establishing a single database for the region (ReefBase Pacific), which offers an enormous quantity of previously inaccessible grey literature as well as a very detailed map of old coral reefs in the Pacific.

The start of component 3A on "Capitalisation, development and extension" was also delayed, but is now catching up and crosscutting studies have begun, including on socio-economic aspects and development of MPA business plans.

Despite very inadequate resources, component 3B ("coordinating unit") ensured satisfactory piloting and international visibility for the programme. The coordinator also set up a bilingual web site on programme output.

(1) The total area is in fact a little larger, as the FSPI has not provided us with the area of 3 of its MPAs included in the CRISP

Project successes and pointers for progress

The conditions under which each project was analysed are summarised in Appendix 1.

Although some of the MPAs supported by the projects were established some time ago (St Lucia), most are recent and the scope for significant assessments of the socio-economic benefits of intervention is therefore limited.

Having established these limitations, the assessment produced the following general observations.

Successes to build on

There is a great deal of output from all of the projects (methods, experiences, communication documents, etc.), which could nourish exchanges of experience between management bodies (see list of outputs and transferable results in Appendix 2).

The main contributions of the FGEF projects are as follows:

- The projects concern 70 marine protected areas covering 8600 km², including:
 - 150 km² of MPAs created and 465 km² pending plus 3 MPAs to be created in Meso-America, totalling just under 1000 km² in progress.
 - 8 000 km² of MPAs strengthened, not including the Phoenix Island MPA, the world's largest at 410 500 km², established with support from the CRISP programme.

Several of these marine protected areas, and especially their no-fishing zones, are producing tangible results (St Lucia, Senegal, Mozambique – see chapter on “Managing fisheries”, p.58).

Working session on the Sand Fly MPA management plan, Solomon Islands (© T. Clément)



- The projects have greatly increased scientific knowledge. A great many scientific studies have accompanied the creation, management and monitoring of MPAs (Mnazi Bay, CRISP, Quirimbas, Meso-America, Narou Heuleuk, SMMA, Cocos Island). Over 3000 scientific reports have been published and/or posted online (including about 2500 under CRISP), mostly biodiversity inventories, use studies and socio-economic studies. This basic knowledge has usually (but not systematically) been handed over to local populations, which is a major benefit of MPA projects both locally and internationally.

- The projects have made substantial contributions to environmental education and capacity building, with significant transfer of ‘knowhow’ (Mnazi Bay, CRISP, Quirimbas, Meso-America, Narou Heuleuk, SMMA, Cocos Island, Seychelles, etc.). Taking only formal training into account (for monitoring, management, new fishing methods, tourism, alternative livelihoods, etc.), the number of people trained is probably in excess of 2000, not counting the many workshops and other information and awareness-raising activities in which a great many people have taken part (rangers, fishermen and other community members, students). The methods used (exchange visits, workshops and campaigns) are varied and often original (such as the film and discussion sessions in Senegal).

Examples

- **Meso-America:** training for about 200 people.
- **Cocos Island :** training for all rangers.
- **Quirimbas:** training for 700 to 800 people.
- **Mnazi Bay:** training for nearly 250 people plus 13 500 participants in different workshops and awareness-raising activities.
- **Narou Heuleuk:** numerous training sessions on MPAs (exchanges), associated economic activities (e.g. oyster farming) and a great many interventions in schools (training for several hundred people and thousands involved in awareness-raising).
- **OPAAL:** numerous training sessions for economic operators and MPA staff
- **CRISP:** numerous training sessions, student exchanges (several dozen from the Pacific in higher education courses with French laboratories involved in the programme).

Exchange visits (Mnazi Bay, CRISP, Quirimbas, Meso-America, SMMA, Narou Heuleuk, OPAAL, CRISP, etc.) were among the most effective methods and all participants agree on their usefulness.

However, few studies were made on the impacts of education and training and the different methods used (OPAAL).

- Considerable experience was gained in **developing local community participation**, and involvement in MPA management is clearly increasing (Meso-America, SMMA, Narou Heuleuk, Mnazi Bay, Quirimbas and CRISP). In many cases, the projects have helped to trigger the necessary marine envi-

ronmental protection dynamics within communities (SMMA, Narou Heuleuk, Mnazi Bay, Quirimbas and CRISP).

- Overall, the projects have considerably **strengthened local governance**:

- establishment of fishermen's groups or alternative livelihood development groups (Meso-America, SMMA, Narou Heuleuk, Mnazi Bay, Quirimbas);
- capacity building among members enabling them to take part in MPA management or to develop sustainable livelihoods (fishing, ecotourism and others);
- participation of village communities and other stakeholders in MPA management committees (in most of the projects).

Experience confirms that strengthening local governance for resource management, based on close involvement with local populations, is a determining factor of MPA success.

- The projects have also helped to strengthen official **recognition of the rules governing customary rights**. This is particularly true for the South Pacific (CRISP project). In most cases, the projects have also strengthened decentralised natural resource management.

- **Partnerships** have been forged or strengthened: this is particularly true at the institutional level in regional projects (Meso-America, Caribbean, IOC, South Pacific) and in the case of partnerships with private operators (Meso-America, Thailand, Seychelles), between scientists (South Pacific) or between MPA management bodies (IOC, South Pacific).

- Some projects have also accompanied or prompted processes to **strengthen legal instruments** (Meso-America, Costa Rica, OECS, Northern Province of New Caledonia).

- Analyses of eco-regional planning have improved **knowledge on outstanding sites** requiring protection for their biodiversity (New Caledonia, French Polynesia, IOC) and commercial species (Meso-America).

- **Extensive monitoring networks implemented by virtually all the projects, whether biological** (over 100 stations monitored and 54 as part of the monitoring system for no-fishing zones) or for socio-economic and management assessments. The networks provide input to global monitoring systems for coral reefs, MPAs and socio-economic aspects of coral reef environments (GCRMN, Reef Check, SocMon and others).

- **Surveillance facilities have been strengthened**, especially by purchases of new boats (Mnazi Bay, Quirimbas, Cocos Island, SMMA, Caribbean, Senegal).



Oyster farming training session, Casamance's MPA (© Océanium)

Experience also shows that supplying technical assistants has been a key factor of success for some projects (SMMA in St Lucia and CRISP in the Pacific).

The review studies have developed original methods for evaluating the effectiveness of project financing. For example, the economic internal rate of return (EIRR) was calculated for 4 of the MPAs (Bamboung, SMMA, Mnazi Bay and Quirimbas), with results presented at the IMPAC2 congress in Washington, DC in May 2009. The consultants for the study also developed the "compass card" method for monitoring MPA development (see details below), which has been adopted by several of the MPA management bodies we met during the assessments.

Pointers for progress

- **Project programming is often overambitious**: too many activities planned in view of the project execution schedule, the human resources available and, often, the capacities of project management unit. Under these conditions, although several projects seem to be below target, the real problem is unrealistic programming (Meso-America, Senegal, Caribbean, South Pacific, IOC, Thailand, etc.).

Increasingly, projects are planned as if their activities were to begin immediately after the

financing agreements are signed. In practice, establishing project management units and the operational means they need, and forging the necessary partnerships, can take a considerable amount of time. Taking enough time to complete the initial project phase is an investment that argues in favour of lengthening the duration of projects.

In most cases, after just 2 to 4 years of project activity in the field, it is unrealistic to expect ecological and economic benefits and impacts on the living standards of populations, as these will not be apparent for at least 10 years. In Mnazi Bay for example, there could not be any tangible results within four years given the context of extreme poverty, high community dependence on resources, limited project management capacities and inadequate external support.

- The feasibility studies produced prior to the reports presenting the projects to the GEF should be more detailed so that they can support an assessment of all project risks, which have not always been well defined.

Assessment studies need to be strengthened on the following points:

- obstacles of a political nature and institutional or legal weaknesses, which have prevented smooth implementation in some cases (Senegal, Thailand);
- the inadequacy of human resources, and sometimes skills, in project units that do not receive adequate support or when support cannot be effectively developed (management units unwilling to receive support, relational problems between partners);
- critical assumptions for the conduct of projects, in other words, problems of external

origin that are beyond the management unit's control (legal gaps that may void proceedings, drug trafficking);

- soundness of assumptions on the feasibility of activities (the Tanzanian project relied on tourist development to support the MPA, but the zone is too remote, receives only a few hundred tourists a year and tourism would be too dependent on external factors; certification of lobster fishing in the Meso-America project proved impossible).

- Regional organisations (IOC, OECS, WWF regional implementation unit for the Meso-America project) have the advantage of working at a coherent eco-regional scale and being in a position to develop synergies, but often have to deal with cumbersome red tape and delays before activities can be implemented. Managing these projects is very complex and requires robust and dynamic management units as well as correspondents in each relevant country. Experience shows that it is essential to have local officials working full-time on programme implementation in MPA sites (it is quite unrealistic to rely on a regional organisation to do this in their place).

In projects involving multiple funding agencies (WB, UNDP or GEF), administrative complexities and different procedures (e.g. procedures for justifying the use of funds, content of activity reports required by each agency), and the complexities of the institutional project set-up are often given as reasons for delayed implementation (OPAAL, Mnazi Bay). However, addressing the issue by adopting only the most cumbersome and least flexible procedures (often those used by multilateral agencies) does not solve the problem (OPAAL). Although harmonised procedures are advisable (especially activity reports and monitoring tools), room for manoeuvre needs to be preserved in project implementation (especially where the management of funds is concerned).

- Our analysis shows that **it is essential to involve the main local stakeholders from the project set-up stage** and that failure to do so can slow and even obstruct future project implementation (as in Tanzania, Mozambique, Seychelles and Senegal).

- The development of **alternative livelihoods** requires particular attention, and especially:

- preliminary identification studies of (1) activities causing harm to biodiversity which the project is aiming to mitigate, (2) development needs (3) target populations for AL development (as far as possible, target populations must take part in these studies);
- proposals for technical and socio-economic solutions made by qualified professionals in the sectors concerned, in consultation with future beneficiaries;

Presentation of the Cayos Cochinos marine park, Honduras (© C. Gabri e)



- the supply of training or accompaniment during the development of alternative livelihoods in the field;
- location and identification of professional partners capable of supplying the above services (which are often in areas where skills are partly or entirely lacking among project operators).

● In most of the projects, **continuous monitoring systems are often implemented too late**. It is essential to begin monitoring in the earliest stages of the project, and even before protective measures are applied, to ensure that project impacts are reliably measured. Monitoring should be based on indicators concerning biodiversity and the socio-economic benefits of MPAs.

● In several projects, **research activities were overdeveloped to the detriment of practical activities in the field** (CRISP, Meso-America) or consultations with local populations (Mnazi Bay). Conversely, management plans and, especially, effective zoning plans (Quirimbas, Narou Heuleuk), cannot be properly applied without the backing of sufficient scientific data. The right balance therefore needs to be found while running both activities (research and action programmes) together. In most cases, processing and capitalising on research and monitoring results from the projects has been very inadequate and needs to be substantially strengthened.

● Similarly, protection for **catchment basins upstream** from MPAs is still limited, which can jeopardise protection efforts downstream (SMMA).

● Planning for **long-term MPA financing** (business plan) often occurs at too late a stage, and needs to begin as soon as the protected area is created and begins to operate, failing which all the benefits of the project activities undertaken may be lost (as at Mohéli in the Comoros). To date, only one MPA, Cuero y Salado in Honduras, is entirely self-sufficient, thanks to substantial income generated by TV reality shows and scientific tourism.

● Physically circumscribing the boundaries of the protected area with marker buoys is absolutely essential for the MPA to function properly (recognition and appropriation). Although this



Working session with the OPAAL project staff, Eastern Carribean (© Projet OPAAL)

is often planned (Quirimbas, Mnazi Bay), it has only been done in practice in a few rare cases (SMMA, Narou Heuleuk).

● Except in the Meso-America project, **the FGEF has a fairly low profile** in projects involving multiple funding agencies. Communication projects often have limited means, and should receive more. There are a few exceptions, such as the world renowned SMMA or the Narou Heuleuk project in Senegal, where the NGO Océanium has received national and international media coverage (articles in *Terre Sauvage*, *National Geographic* and *GEO* magazines, a local television programme, *Thalassa* on French television, BBC coverage, etc).



Cuero y Salado marine park entry, Honduras (© C. Gabrié)

Summary and conclusions by topic

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Scientific station's wharf in Cayos Cochinos, Honduras (© C. Gabrié)

Designing MPA projects

The project preparation phase is always critical. Feasibility studies should be drawn up with care and adapted to the financial and scheduling complexities of each situation.

They may involve several increasingly detailed stages, from project identification to the feasibility study proper, and may, if necessary, continue into the initial project start-up stages (e.g. finalisation of certain activities after additional consultations with the population).

These stages are crucial to ensure that various essential conditions are present from the outset, as it is difficult and sometimes impossible to rectify matters once the project has begun. Listed below are the points we believe are fundamental, always given that every project is unique and will often need to be “custom designed”.

Project identification

Sufficient work needs to go into project identification to check that the sites proposed satisfy ecological as well as socio-economic and techno-economic criteria (political context, level of motivation of national and local authorities, human resources, site notoriety, reproducibility of results, etc.). When projects or programmes involve several sites, the use of an eligibility matrix to assess each site against these criteria is recommended. A matrix already exists for FGEF projects, but this only concerns projects as a whole and not individual sites.

Project identification is a crucial stage for calibrating budgets. Establishing functional MPAs does not necessarily demand a large budget, especially in remote areas where they are little used.

In the **CRISP** programme, **FSPI**, an NGO, needed only a few thousand € per site to establish several very simple MPAs that were requested by the local communities, under customary laws. In the **Narou Heuleuk** project in Senegal, **Océanium** also succeeded in establishing community MPAs at a cost of less than 100 K€ per site.

Political will

The FGEF examples show that even if political will is not absolutely essential (e.g. Meso-America, Narou Heuleuk), projects are more likely to succeed and move ahead more quickly when the State is proactively involved from the preparation stage (e.g. Quirimbas).

Involving all stakeholders

The feasibility study, and the preliminary studies in particular, must ensure that all stakeholders (i) have been (or will be) properly identified as from the preparatory stage, and (ii) that they will all be involved in the intervention: the different populations concerned (ethnic groups, villages, ages, genders, religious denominations, etc.), economic players (native and external fishermen, gatherers of other marine and coastal products, reef owners, diving centres, water taxis, cruise operators, yacht clubs, hotels, etc.), territorial authorities (village chiefs and mayors and other local management echelons, etc.), central and/or regional or provincial government departments involved in the topic area (environment, fishing, tourism, economic development, planning, etc.).

The **Narou Heuleuk** project run by Océanium in Senegal has produced excellent results. However, insufficient State involvement in the project was probably a factor in the non-publication of the presidential decrees required to create 4 of the 5 MPAs. This was a serious handicap to the project, causing considerable delay and demonstrating one of the possible effects of insufficient involvement on the part of key stakeholders.

In the **Quirimbas** project, the fact that the Ministry of Fisheries was not involved in the project design led to a great many difficulties with the implementation of activities related to fishing. Relationships between the Ministry and the Park authority were only normalised after 5 years.

Participation and involvement of local populations

We shall return to this point in more detail in the chapter on "MPA creation, management and governance". However, the local population's participation and involvement in project preparation is a key factor of success.

At Mnazi Bay, representatives of the authorities and civil society had agreed to the Park's creation. However, it is likely that community participation and involvement process was not handled in a sufficiently participatory and consensual way, as some villages, even today, are still totally hostile to the park, partly because of unfulfilled promised and delayed implementation of supporting activities in the communities.

Using appropriate methods to involve populations in the participatory process

Inappropriate methods of consultation can be a cause of MPA failure. In the most complex cases, support from sociology or anthropology specialists may be required.

In the **Yambé – Diahoué** MPA project in New Caledonia (CRISP programme), WWF-France, with support from a local anthropologist working for the IRD, devoted a considerable amount of time to gaining insights into the workings, perceptions and management methods of local society to ensure the project would abide by their modes of organisation and decision-making to achieve appropriate and suitable forms of protection and management. Thanks to these precautions, the solutions proposed seem to have been accepted by all the stakeholders.



The Yambé-Diahoué MPA in New Caledonia (© T. Clément)

Systematic ex-ante identification of MPA impacts and of all individuals and communities penalised by the project

The impacts of the project and the MPAs must be clearly identified from the outset. In particular, individuals and communities penalised by the project must be identified clearly, as well as the nature of adverse effects, how long they will take to appear and how long they will last. Compensatory measures must be provided for in the project to resolve these problems, and they must be discussed with all stakeholders. In the most problematical cases, an approach on the lines of an impact assessment may even be made to put forward a plan for managing the project's adverse effects, in which



A discussion workshop on issues facing the zone and possible solutions (© SMMA)

When the **Soufrière Marine Management Area** in St Lucia was created, the feasibility study had identified about fifteen elderly fishermen who would not be able to adapt to the changes in fishing (reef fishing transferred to the open sea). Having identified those likely to be penalised, the study proposed a compensatory measure for this particular group, in the form of an exclusive right to fish in zones banned to other fishermen.

compensatory measures, including of a financial nature, should be included in charge by the project.

In virtually all the MPA projects assessed for this study, financing came to an end, at best, between phases 1 and 2. The Soufrière Marine Management Area in St Lucia is one of the very few in the study sample that have reached phase 3. Thanks to successive financing from the French cooperation system and the FGEF, the project was accompanied for more than 7 years. In the case of projects where financing came to end prematurely (e.g. Narou Heuleuk in Senegal, the CRISP MPA in the South Pacific, Mnazi Bay in Tanzania, etc.), the assessments have usually concluded that new sources of financing must be found after the project ends, to avoid losing the benefit of all the efforts already invested. The example of the Mohéli MPA in the Comoros is striking in this respect, and clearly shows the dangers of withdrawing financial support from projects before they achieve self-sufficiency. The Mohéli Marine Park received multilateral financing for 5 years, but no funding at all to pursue its activities, or even to run the management body. The highly noteworthy results obtained with this project evaporated in 2 or 3 years, as did the trust of the local populations which had participated very actively at the time of the park's creation.

Projects need time to develop

The study shows that there is a fundamental need to accompany MPA projects well beyond the usual project duration (3 to 5 years), for as long as 10 to 15 years, if the aim is indeed to establish MPAs that are institutionally, technically and – especially – financially self-sufficient. Our study suggests that most MPAs develop through 3 phases before they can achieve self-sufficiency (see chapter on “MPA creation, management and governance” p.43). From the “preliminary” creation phase to the third “self-sufficiency” phase when MPAs become mature, FGEF projects only finance, at best, phase 1 and part of phase 2, so that the MPA often has no support at all to reach phase 3, which is precisely when it would be achieving a degree of self-sufficiency.

Systematic analysis of the project's internal and external coherence

The feasibility study is the best time to investigate whether, for each project component, the means are suited to the objectives sought, in terms of technical, scientific, financial and organisational consistency, etc. For large-scale

projects and programmes, this is also the right time for an in-depth review of consistency among the different components, and to identify any redundancies and/or gaps. Reviewing internal consistency is of particular importance for projects funded from multiple sources, where the complex procedures of some agencies and the lack of uniformity are often cited as factors of delay. In such cases, efforts to ensure consistency in applying these different procedures before starting up the project can prove very useful (e.g. OPAAL or Thailand projects).

The **Andaman Coast** project in Thailand developed an administrative, accounting and financial procedure that is compatible with the standards of the two joint project developers, the National Parks Department and the WWF.

Finding the right balance between studies and practical action

One of the criticisms made by local populations, and sometimes MPA management bodies themselves, is that the preliminary phases (identification, feasibility, benchmark studies, etc.) and start-up phases (species inventories, identification and development of alternative and/or income generating activities, management plan, business plan, etc.) absorb too many, and sometimes far too many, resources compared to action in the field (equipment, recruitment of the management team, patrols, etc.). Finding the right balance is sometimes difficult but deserves close attention.

In the **OPAAL** project implemented in 6 countries in the eastern Caribbean, where a great many preparatory studies were made (fundamental research, studies of alternative activities, training and awareness-raising needs, management plans, etc.), comments were made on seven occasions during the assessment, by the populations but also site managers, on the fact that the preparatory studies and consultation meetings had lasted long enough and that it was time to move on to practical activities that everybody could see (equipping and marking out protected areas, organising patrols, etc.).

Catchment basins should be included in MPA projects, at least in island environments

Catchment basins should be included in MPA projects, at least in island environments. In large-scale projects, it is very difficult to incorporate catchment basins into MPA projects, as they sometimes cover several hundred and even several thousand km². In some small island projects, however, including catchment basin issues is not only desirable but virtually essential. Not including these areas in MPAs will always compromise the project's long term viability.

When the Soufrière Marine Management Area in St Lucia was created, land areas were not included in the project (except studies). The MPA worked very well for over 10 years but today, problems stemming from land areas (pollution, solid waste, urbanisation, erosion, etc.) are seriously compromising the future of the coral reefs and therefore of the MPA. The post project evaluation for this MPA therefore proposed extending the MPA mandate to neighbouring land areas and, obviously, launching a process to attempt to remedy these problems.



The NEMMA in Antigua & Barbuda, one of the OPAAL project sites (© Projet OPAAL)

For scientific monitoring of MPA impacts (see chapter on "scientific research and monitoring", p70), in the case of projects with intervention sites but limited means, it may well be useful to carry out very detailed monitoring in one of the sites and to apply less demanding protocols in the others.

In the **SMMA** project, the habitats monitoring system (reefs, fish, sedimentation, etc.) has sometimes proved so detailed and efficient that a great deal of raw data is still waiting to be processed (e.g. on sedimentation). Other surveys are also measuring the effects of the project on populations.



© A. Medina

In the **CRISP** programme, a highly detailed monitoring system was also developed by the coordinator to monitor the results of several components operating simultaneously in different sites and countries. However, effective as it is to monitor results, the system needs an additional component to monitor the effects of the programme on the environment and on populations, which is lacking at present.

Taking enough time to calibrate an enduring and effective project monitoring system

All MPAs need a monitoring system. Finding the time to calibrate the system so that it will provide the necessary data without becoming too costly is not always easy. Drawing up a logical framework validated by the main stakeholders and the funding agency will be of great help on this point (see chapter on "scientific research and monitoring", p70)

The set of indicators must be selected to enable not only activity monitoring but also effective assessments of results and environmental and socio-economic impacts after the programme ends. For qualitative data, means need to be provided to implement the methods to produce essential primary data, such as surveys on project perceptions among populations, case studies on individuals who have switched to different activities, etc. These surveys can be made by students, which lessen their cost and provides countries with the means to disseminate the knowledge gained.

Institutional project set-up

Most projects are built up according to the classic pattern, with ministries or environmental NGOs in the role of project beneficiaries. Project development is often entrusted to NGOs acting as operators in the field, in liaison with local stakeholders who form the MPA management committee. Although there are exceptions, the project analyses showed that there is a link between project effectiveness and the simplicity or otherwise of their institutional set-up (very simple for St Lucia's SMMA and Senegal's Narou Heuleuk projects; very complex for the OPAAL project).

The CRISP project features an interesting partnership between funding agencies and international NGOs, where the latter act simultaneously as project funding agencies and as the implementers or developers of its different components. Although risks can arise with this type of organisation, in the particular case of a programme including both French overseas authorities and neighboring countries, it was able to aggregate overall programme funding and to include French overseas authorities which would otherwise have been excluded (since the AFD cannot provide grant funding for projects in French overseas areas and the FGEF can only finance expert and other services originating from these areas under regional projects).

The example of the SMMA, which is the oldest MPA in the FGEF portfolio, is also of interest in that it shows that an institutional set-up does not have to be cast in stone. The difficulties inherent to the life of an MPA, even when it reaches maturity, sometimes require amendments to the institutional framework to adapt to changing realities and revitalise the MPA project.

Scarcity of qualified human resources

Several projects are operating in sparsely populated small island states and are highly dependent on individuals and the human factor. The various uncertainties involved in running projects in these tiny states (sourcing qualified resources locally, limited choice of management staff, fluctuating political priorities) can be reduced by delegating project management to an inter-state organisation, provided it is strong enough. These organisations are often competent and have enough legitimacy to exercise effective authority during project implementation. These regional projects can also be large enough to qualify for long-term technical assistance.

Forging partnerships beyond the project perimeter

Because access to financing from project funding agencies is so competitive, project operators tend to be rather inward-looking, attempting to implement all of their project activities themselves although they do not necessarily have the required expertise. This sometimes compromises the effectiveness of projects that might otherwise have benefited from synergies between operators with specific relevant know-how. The assessment noted that whenever this did occur, the effects were very beneficial to projects. As far as possible, during feasibility studies or external assessments, it is important to look into and develop possibilities for such partnerships.

The example of the **Meso-America** project clearly shows the advantages of mutually beneficial partnerships that expand the range of 'knowhow'. Activities at regional level are conducted by several NGOs working in tandem. For example, the partnership with TNC, an NGO with experience in the use of Marxan planning software, enabled the project to analyse and plan for gaps in protected area coverage. In the Indian Ocean Commission project, a partnership was formed with the Wildlife Conservation Society to conduct the eco-regional analysis, while in Polynesia (CRISP), the WWF worked with the French national marine protected areas agency.

FGEF project assessment and monitoring

FGEF project assessments have encountered problems of two kinds.

On the one hand, these are usually multi-agency projects in which the FGEF grant is part of the whole, so it is not always easy to assess the FGEF's contribution when its funds are not allocated to specific activities. To facilitate both project monitoring and assessment in these cases, it would be helpful to have uniform formats for activity reports from the start.

On the other hand, it is important that the FGEF secretariat should monitor projects more frequently through periodic missions in the field, especially when difficulties arise. This is especially important as the FGEF member institutions do not all have the means to conduct such missions on behalf of the secretariat.

In the **OPAAL** project, the Organisation of Eastern Caribbean States (OECS) is the project developer working with relay institutions in each of the 6 member states. Thanks to this regional arrangement, the project is able to use resources from the OECS department for natural resource management (its Environment and Sustainable Development Unit). The Indian Ocean Commission is also involved in the project for implementation of a marine protected areas network (IOC NMPA), but in this case using the services of the WWF regional office as the project developer.

MPA creation, management and governance

Planning MPA networks: a useful stage in project selection

Studies to identify coherent MPA networks within uniform ecoregions have increased in number in recent years. They have the advantage of drawing the attention of decision-makers to the locations of outstanding sites that are important for the preservation of the biodiversity and ecosystem functions of a particular eco-region.

In some of the projects assessed, these analyses have been invaluable to the preliminary identification of important sites on which to concentrate financing and protective efforts (MPAs in the Meso-American reef, Senegal, the Quirimbas and Mnazi Bay). Other projects where eco-regional analyses have been financed have then been able to prioritise MPA sites on which to concentrate efforts (e.g. CRISP in the South Pacific and the IOC NMPA in the Indian Ocean).

The use of these methods shows, firstly, that for many eco-regions, fundamental data are lacking or very uneven, and secondly, that scientific knowledge on important issues affecting the choice of sites to be included in a network is still inadequate. For example, the connectivity (the relative positions and distances required between MPAs to establish a viable network), resilience (to ensure that the sites chosen can be effective sources for the recolonisation of surrounding degraded zones), and optimal size of MPAs are rarely well documented.

- In **New Caledonia** (CRISP), studies identified 20 priority areas for conservation, including several of worldwide importance.
- In **French Polynesia** (CRISP), identification studies, essentially based on geomorphological criteria for islands and atolls and on expert knowledge, have made good progress.
- Sites in the **Indian Ocean** are currently being identified.
- In **Meso-America**, the eco-regional analysis made before the project was supplemented by a specific study on important sites for species of commercial interest: 15 important sites for fisheries were identified, of which 50% are already included in protected areas.



The scientific station at Cayos Cochinos (© C. Gabrié)

One difficulty in such studies is the remote location of the research data sources. Despite international efforts to compile scientific knowledge on biodiversity (FishBase, ReefBase, OBIS and other international databases), these databases are still too scattered and hard to access. FGEF projects should therefore include a clause whereby all data collected during implementation should be supplied to the FGEF and communicated to international databases to ensure proper transmission, storage and to avoid the risk of losing data.

The management body

The MPA management bodies in FGEF projects differ widely. They may be government departments within the ministry in charge of MPAs (e.g. Mnazi Bay Marine Park in Tanzania, the Quirimbas National Park in Mozambique and the Cabrits National Park in Dominica), independent parties with a management committee made up of different stakeholders including economic operators (e.g. St Lucia SMMA and the Tobago Cays marine park in St Vincent & the Grenadines), NGOs (all MPAs in the Meso-American Reef project), local communities (e.g. the Bamboung community MPA in Senegal and Marou in Vanuatu), or various combinations of these.

While state bodies theoretically guarantee the legitimacy of a protected area, in the projects assessed in this study, virtually none of them had the means to ensure effective management. Moreover, their management methods hardly ever take the concerns of local communities into account.

The flexibility of NGOs and their attentiveness to expectations among populations often make them more effective managers. However, these NGOs can find it difficult to involve government departments in local approaches to protection, and to ensure that protected areas are taken in hand by government authorities. Local NGOs are usually very close to realities on the ground (e.g. Océanium in Senegal or FSPI in the Pacific).



Creating a "tree diagram" of MPA issues in the Solomon Islands (© T. Clément)

The assessment found no MPAs that were managed directly by local communities, as they are always supported, even minimally, by an NGO. Generally speaking, local community responsibility for MPA management only works well on a small scale (South Pacific or Bamboung in Senegal), demands local leaders with strong enough legitimacy to enforce rules, and often has to rely on respect for local customs (e.g. South Pacific).

In the developing countries where FGEF projects are running, joint management solutions are sometimes the most effective. Management responsibility belongs to the government or a public institution which is

assisted by the NGOs supporting the local communities. However, this kind of organisation demands a very clear division of authority between the different parties, which must be well understood by all stakeholders (and achieving this can be costly and time-consuming). In the more developed countries where MPAs are capable of generating their own income (e.g. SMMA or Tobago Cays), the most simple and effective system is often state-delegated management responsibility to an independent and financially self-sufficient organisation with autonomous decision-making powers.

The need to take all parameters into account to define the MPA perimeter

Deciding on the MPA perimeter usually depends on biological criteria, although these are not sufficient in themselves. Social data (links between villages) and an understanding of uses, users and where they come from are just as important and need to be analysed before the final decision on the MPA perimeter.

Links between land and sea areas are also fundamental, especially in island environments. Despite this, in their analyses, very few MPAs include the catchment basins that are the sources of pollution threatening their integrity. For example, the proven effectiveness of SMMA management (St Lucia) has been compromised by land-based pollution from upstream soil leaching. The Meso-American Reef project is exemplary for its efforts to reduce pollution from agricultural treatment residues in the catchment basins.

Zoning is essential to conservation and management and must be defined on a scientific basis and through participatory methods

Most of the projects have a zoning plan separating the MPA sectors into zones under different regulations depending on their purpose. Zoning is of variable complexity in the FGEF projects (2 to 10 zones).

Zoning is essential. It has proved its effectiveness in resolving use conflicts (as in the SMMA, where zoning has resolved recurrent problems between fishermen and tourists) and in helping to increase stocks in no-fishing zones.

To help conserve biodiversity and resources, the definition of the number, location and size of no-fishing zones is essential if they are to have

an impact beyond their boundaries and across the entire MPA. Because of the importance of protecting habitats that are vital to certain stages of the life cycles of commercial species (spawning, shoaling, nursery and migration zones), projects must identify these zones as early as possible in the process of creating protected areas.

To be effective, zoning plans need the backing of sound research, the legitimacy of decisions made in a participatory manner and, where relevant, the zones identified should match recognised and long-standing traditional management zones (e.g. the Yambé and Diahoué MPA in New Caledonia).

If the means are not available to conduct base studies, an intermediate form of zoning for demonstrative and local awareness-raising purposes may be considered. The zoning plan should then be reviewed in light of scientific knowledge acquired at a later stage. The zoning plan for the Quirimbas Park, for example, was developed without in-depth studies and now needs to be revised to match conservation objectives more closely.

Participation and involvement of local populations are keys to success

The participation of local populations is now recognised as one of the key factors of MPA success. There are several levels of involvement, all of which are represented in the FGEF projects, from participation in the creation of the MPA up to co-management:

- Participation in MPA creation (Quirimbas, Pacific areas in the CRISP programme, Senegal in the Narou Heuleuk project run by Océanium);
- Participation in management through stakeholder representation on management committees (in virtually all projects) and sometimes in certain activities (fisheries co-management by fishing committees at Quirimbas);
- Participation in the development of MPA management plans through participatory workshops (MPAs in the Narou Heuleuk, Meso-America, Mnazi Bay, Quirimbas and CRISP projects);
- Participation in decision-making via the offices of MPA management associations (SMMA and Tobago Cays in the Caribbean);
- Participation in data collection for monitoring of the MPA effects after its formation (Mnazi Bay, Quirimbas, CRISP MPA);

- Physical participation in patrols (Bamboung MPA in Senegal, Mnazi Bay, Quirimbas, CRISP).

A comparison of MPA experience in Mnazi Bay and the Quirimbas shows that consultation efforts must be given priority to secure community involvement, rather than relying on the force of scientific research results. There is nothing to prevent the development, in close consultation, of a provisional management plan, as long as provision is made for a participatory review once research results are available. In the case of the Mnazi Bay Marine Park, the project start-up phase was mainly devoted to numerous scientific studies, to the detriment of exchanges with local populations. Conversely, in the Quirimbas, very few scientific studies were made as the main emphasis was on relationships with the communities. In the final analysis, management rules are better accepted in the Quirimbas, while at Mnazi Bay, several villages are still very hostile to the park.

Our examples show that the level of community participation essentially depends on 2 factors: (1) thorough knowledge of the context and the approaches and techniques used, and (2) the time taken to engage and maintain community involvement in the participatory process.

Taking the time to win people's trust

The MPA creation phase is when particular attention must be given to the way local populations are to be involved. This is most critical phase and any mistakes made at this time will be difficult to correct later on. Unfulfilled promises, for example, can compromise local involvement over time and even arouse actual hostility on the part of some villages. There are many examples of village opposition to projects, including to those advocated by neighbouring villages (e.g. Mnazi Bay). The St Lucia SMMA, though often cited as an example of MPA success, was the scene of violent conflict on several occasions until the situation calmed down, and managing still latent conflicts has remained one of the main management objectives for this MPA.

Keeping closely in touch with the field for a long enough period is necessary to win the trust of local populations, particularly when there are conflicts, and to understand the social mechanisms at play. This requires a long-term presence in the field (2 years would seem to be the minimum), in close interaction with the community (e.g. Yambé and Diahoué in New Caledonia).

Understanding the context

Unless there is already a thorough knowledge of the context, it is useful to devote time and means to understand the social organisation of local communities, how they function and their representations of the environment, and also to



Petit Kassa MPA canoe in Casamance (©T. Clément)

identify the cultural features that can either foster or inhibit their participation in setting up the protected area. These studies are also useful to the management plan, as they help to develop rules and management methods to suit the context. It is important to conduct these studies at the right time, whenever possible before the decision is made to create the protected area (e.g. studies made in New Caledonia). Analyses conducted after the event may not be robust enough to lessen any hostility that has already taken shape (e.g. Tanzania).

Community leaders have a determining role; they should be identified from the outset and their influence used to promote the project (e.g. Quirimbas, Senegal and New Caledonia).

Similarly, the creation of new community groups, when required for management purposes, needs to be carefully analysed in the light of the existing social context to reduce risks of damaging social cohesion. In the Mohéli marine park in the Comoros, village environmental associations were set up, partly for another multilateral project. These associations, often formed between young people, were given a number of powers and responsi

Mohéli: how poor knowledge of the cultural context can lead to inappropriate rules

Collecting octopus, fish and shellfish along reef platforms at low tide is very common in the Mohéli marine park (Comoros), and tends to be very destructive as coral colonies are trampled or overturned. This is done by fishermen, but also by women and children. But for the youngsters, this activity is also a form of apprenticeship in line fishing before they go out in boats. An outright ban on the activity, with no consideration for its importance as a way of training young fishermen, could only fail. This social aspect was only brought to light by a detailed study of the fishing context.

In the **Yambé – Diahoué** MPA project in New Caledonia (CRISP programme) the WWF, with the support of a local IRD anthropologist, worked for a long time on these aspects before setting up the MPA, to ensure that customary organisations and their modes of decision-making would be respected. Having taken this precaution, the solutions put forward by the project are likely to gain acceptance from all those concerned.

Examples of village groups set up by the projects

Meso-America: fishermen's groups

Quirimbas: community fishing councils (CCP), fishing associations, micro-credit groups and AL groups

Tanzania: village liaison committees, Village Environment Management Committee (VEMC) and AL groups

St Lucia: fishing cooperative; hotelier associations, diving and yachting centres and cruise operators are also members of the MPA management committee.

CRISP: Many MPAs in Melanesia and Polynesia were set up through community organisations. These zones, which are "managed" rather than "protected" are included in the worldwide Locally Managed Marine Areas network (LMMA)

bilities (via agreed funding) to the detriment of the traditional authority of their elders.

It is vital for the explanations and consultations phase prior to the creation of a marine park and the compensatory action phase (often included in the management plan) to give consideration to individuals and groups who will be penalised by the project (at least in the short term). Early identification of these groups within the protected area's sphere of influence is very important. They will usually be fishermen to whom solutions must be offered (e.g. SMMA).

Using the right approaches

The methods of information and communication used must be suited to the context. It is not always absolutely certain that all stakeholders have been well informed during consultations, or that the decisions made are fully in agreement with local rules of conduct. This is a major risk when communities have complex organisation and power-sharing rules, as in the South Pacific. Inadequate or inappropriate methods of consultation can cause MPAs to fail.

Using participatory approaches requires sound methods but also relevant know-how. Some methods, like the film and discussion sessions organised in Senegal by Océanium or the theatre in Quirimbas have proved highly effective. Participatory workshops are often used and help the various stakeholders to build up MPA projects collectively. However, it is important to ensure that the representatives for each group of stakeholders have enough legitimacy, and that these representatives provide the group with accurate feedback on information shared and decisions made.

The methods used in Senegal by Océanium to foster local participation and exchanges of ideas involve village events and have been very successful. These are based on screening films made on the spot by the Océanium team, featuring local problems like declining catches and fish sizes, smaller mesh sizes and so on), the aim being to get the audience to react and start making suggestions for solutions.

Participatory mapping (e.g. Tanzania, Mozambique or New Caledonia) is also a useful tool for involving communities in developing management plans.

Exchange visits have proved to be an excellent way of prompting participation in several projects (Mnazi Bay, MAR, Narou Heuleuk, OPAAL, SMMA, CRISP), and those who have taken part agree unanimously on their value.

Maintaining the dynamics of participation

This seems to be the most problematical point. Once the enthusiasm and dynamics of the early MPA stages begin to wane, maintaining the dynamics of participation is the biggest challenge for an MPA.

Mobilising communities and active players therefore has to be an integral part of park management activities, for several years. The question of "bonuses" and other "rewards" for volunteers, for a time at least, needs to be given consideration. Several points must be examined:

- The need to give particular attention to the human dimension among all those who volunteer their efforts in favour of the MPA for little or no reward,
- The need to keep community dynamics going through regular meetings (1 or 2 a year, to present the year's results and the activities planned for the following year),
- The need to offer motivation of some kind (moral or financial).

The management body also needs to provide communities with periodic feedback on knowledge gained, on how resources are evolving, on monitoring results, etc.

The **Quirimbas** park is one of the FGEF/AFD projects analysed where community commitment is strongest, since village people and their leaders had requested the park's creation themselves after 2 or 3 years of preparation and discussions. Many of the community rangers volunteering their efforts today were among those involved at the outset.

As is often the case in MPA projects, the initial dynamics were very strong. Although they are still perceptible, there is also evidence of discouragement among some of the groups, and signs of emerging discontent. Many of those concerned are withdrawing as they have not yet seen the promised benefits and do not feel that their work is being rewarded. Survey results also show that several villages still do not have a clear idea of what the Park is for and whether they are part of it or not.

Traditional forms of management offer a sound basis for appropriate MPA management

The Pacific, where the CRISP programme is running, appears to be the region where these traditional forms of management have survived most strongly and where activities to establish MPAs have attempted to include these aspects (New Caledonia, Solomon Islands, Samoa, Vanuatu, Cook Islands, Wallis and Futuna). Studies have focused on a better understanding of the social organisation and customary patterns that facilitate local management, with a view to integrating a form of traditional management into modern law.

In many islands where the programme is running, these traditional practices form the basis for setting up community MPAs and are recognised by the authorities (Vanuatu, Salomons, Tuvalu, Samoa, etc.).

Studies in New Caledonia have shown that preparatory work among communities can also help to retrieve ancestral knowledge and usages and re-create links with tradition. In the Diahot zone in the north of New Caledonia, for example, ancestral management systems (fishing in accordance with the biological cycles of species, catches of species and fishing zones in accordance with the customary status of fishermen, etc.) are still familiar but no longer active. Some customary leaders have asked projects to help them make an inventory of these systems so that current management systems can be reformulated and adapted on a sound cultural basis, especially to redefine management rules for some flagship species that are being routinely hunted (e.g. turtles and dugongs).

However, the traditional rights in question must be clearly identified and used with caution. It must be established that they are compatible with sustainable management as well as suited to the context. The example of "rahui" in French Polynesia is a good illustration of this problem. "Rahui" were traditionally used to establish provisional and temporary bans and are therefore unsuitable as a way of legitimising permanent fishing bans.

A meeting with villagers in Vanuatu
(© T. Clément)



Management plans are essential but often inappropriately used

It is recognised that management plans are essential to MPA management. They are of many types, ranging from the highly sophisticated (usually for MPAs in developed countries) to the rudimentary, set out in just a few pages and focusing on the essentials (MPAs in Vanuatu or the Solomon Islands).

The plan usually includes a benchmark inventory, a set of long-term targets, a zoning plan, MPA management rules and a programme of activities covering several years and usually organised into thematic areas (research and monitoring, education, surveillance, etc.). In the best cases, they provide an effective guide which is broken down into the annual work plans, but in several cases, the management plan seems to be no more than a necessary formality of no real practical use. In fact, for the purposes of this study, it is rather difficult to measure the use and effectiveness of management plans, as most of the projects assessed use the project document rather than the management plan as a guide (although the two are often highly correlated).

However, the lack of a management plan does not prevent an MPA from functioning and having positive impacts as long as it is properly managed (e.g. SMMA and the Bamboung community MPA in Senegal). In these cases, the highly participatory preparation of the MPA acts as a substitute for a formal management plan.

Updating of the management plan for Punta de Manabique took 6 months. Six workshops and 12 meetings were organised to identify conservation targets, pressures and strategic objectives to be developed, in a participatory manner. Altogether, 157 people took part in the process, including representatives from 22 communities and members of 29 government and non-government institutions.

At Mnazi Bay, the park management plan was officially adopted in 2005 after three years of participatory preparatory work supported by the IUCN. It has been published in English and Swahili and is partly based on Village Environmental Management Plans (VEMP). Those VEMP are spatial development zoning documents and village management plans.

The business plan: currently more theory than practice

The need to predict how an MPA will be able to pursue its activities after a project ends seems obvious, yet few MPAs to date have even a rudimentary business plan (see chapter on 'Financing MPAs in the long term, p52).

In MPAs where financing is most problematical (e.g. with little tourism), ad hoc projects often need to be developed. This can mean calling on specialists in the relevant branches, as economic development is not usually within the competence of conservation managers, NGOs, associations or government departments responsible for MPA management. In all cases, it is essential to begin these studies and associated consultations as soon as possible, as setting up such projects is often time-consuming.



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The **Quirimbas National Park** project is the only one in the portfolio with a business plan. The financial analysis is based on the amount of fees and taxes collected according to tourist numbers and hotel occupancy rates (with 3 scenarios, high, median and low), but includes funding agency contributions for 15 years. The analysis shows that the park should be capable of achieving financial self-sufficiency within these 15 years, even with only 20% hotel occupancy rates, an argument that has most certainly facilitated commitments from funding agencies.

In the **OPAAL** and **SMMA** projects in the Caribbean, the collection of fees on tourist activities (diving, cruises, yachting, etc.) was chosen as the means to cover MPA management costs. This involved in-depth negotiations with the partners concerned rather than prior studies.

Some FGEF projects are starting work on business plans (some of the **CRISP** MPAs, the **Cocos Island National Park** in Costa Rica and the **Bamboung MPA** in Senegal).

The surveillance system: another key to MPA success

Surveillance, a key factor in MPA success, is a real challenge and to date, few projects have been able to implement really effective surveillance given the size of the marine areas involved, the time needed to reach them and the lack of means (boats and fuel, but also legitimate patrol

teams). Poaching is therefore still widespread in most of the projects. Depending on institutional status of the management body and on its means, responsibility for surveillance may be handed to local authorities (official rangers working under the ministries in charge of the protected areas or coast guards working for ministries responsible for national security), to local populations or to rangers recruited by the project.

Navy support has proved highly effective (Costa Rica, Mozambique, Meso-America) and should be sought systematically when MPAs are very extensive. Support from local populations and organisations (e.g. fisheries committees) under a participatory management system is often an effective and inexpensive solution (Pacific, Senegal, Mozambique). However, to sustain the motivation of volunteers, they need training in the same way as regular rangers, and the value of their work has to be recognised and rewarded, financially in some cases (Senegal). In this case, the income needs to be secure (see Chapter on "MPA financing" p.52).

Surveillance cannot be effective without the right equipment. Rangers must be able to intervene rapidly and therefore need boats. This demands large budgets not only to buy or build boats, but also to operate them (fuel costs are very high) and for maintenance. The latter points are often neglected, and the replacement costs of these logistical facilities are rarely looked into.

Investigations into the human and financial resources needed for surveillance must begin at a very early stage in the MPA management process and must be included in the business plan (see chapter on "MPA financing" above).

Surveillance must be accompanied by awareness-raising work, as rules are better observed when the issues are understood. Feedback on the results of scientific research or showing the visible effects of closing off a no-fishing zone are among the best ways of raising awareness among fishermen. Methods like the film projections with discussions used at the Senegal site have proved their effectiveness.



Rangers in the Quirimbas National Park
(© C. Gabrié)

Following up violations of fishing bans is also a recurrent problem in MPAs, as the legal authorities usually take no further action. When violations concern activities in the coastal zone and when there is strong community participation, an effective solution involves delegating the role to the communities themselves or their leaders (fines collected from culprits in the communities responsible by using social pressures that can be exerted within the group).

The problem is still more difficult in the case of industrial fishing. In Costa Rica, where illegal fishing occurs further out at sea, a separate programme was implemented to strengthen surveillance, with purchases of patrol boats, substantial capacity building among surveillance teams (training workshops), strengthened patrols and reinforced partnerships (strategic alliances) with both surveillance teams and fishermen.

The management assessment system

Management monitoring and assessment are essential to management bodies, and have been carried out almost systematically in the last few years, with FGEF projects helping to bring them into general use. Monitoring generally concerns biological, socio-economic, governance and administrative aspects (for details on biological and socioeconomic monitoring, see chapter on "scientific research and monitoring" p70).

Our assessment shows that while resources are largely being replenished within and around no-fishing zones (SMMA in St Lucia, Bamboung MPA in Senegal, Quirimbas National Park in Mozambique), it is difficult to get a clear idea of the effectiveness of MPA management in FGEF projects, of their impact on the environment and their benefits to local populations. There are three reasons for this: the MPAs are still too recent, benchmark data are often lacking and monitoring begins at too late a stage in the project schedule (Mnazi Bay Marine Park, for example). A further problem is that the methods used often change over time, which makes it difficult to analyse results and measure long-term management impacts (e.g. Meso-American Reef project).

A range of methods is available to monitor and assess MPA management. The reference today is the WCPA method (IUCN World Commission on Protected Areas) or its applications. The increasing number of ongoing studies on indicators should not prevent projects from using simple methods that can quickly be brought into operational use by local managers and stakeholders.

Rather than seeking a universal method, it is important to adapt monitoring indicators to the objectives of each MPA and to use complementary methods (monitoring of management effectiveness, biological and socioeconomic aspects, perceptions and uses) to ensure that all management aspects are assessed. An effective assessment system will cover administrative and financial aspects, activities in the field and measurements of the project's effects on the environment and the people concerned.

Ideally, monitoring and assessment systems should comprise at least:

- simple, robust methods and management logs that are usable by local people (management bodies or the population), which does not exclude occasional use of specialists;
- reporting of results in a management log (e.g. spreadsheet) which can be easily used by the management body;
- production as early as possible in the MPA project of a benchmark study on the natural and socio-economic environment,
- involvement of local people in some of the monitoring activities (an excellent means of securing their participation in the project) ;
- development of monitoring on two levels: short-term (every year at least) using simple methods implemented by the management body and local populations, and more elaborate monitoring by scientists over longer intervals (3 to 5 years for example), using methods capable of calibrating participatory monitoring results and measuring management impacts more accurately;
- use of the same methods over several years to acquire long time series and reduce biases arising from changes in methods;
- monitoring designed in accordance with analysis processing capacities (e.g. SMMA, which is producing a great deal of data that are not all processed) but based on appropriate indicators (e.g. by trophic compartment rather than species richness, etc.) ;
- securing financing for these systems to ensure that monitoring endures, while absorbing a reasonable proportion of costs compared to the budget for establishing and operating the MPA;
- assessment results must be made public, especially among populations in the MPAs.



The positive results on fish populations in the Bamboung MPA, one of the few where a benchmark study was made before applying protective measures, and the results recorded for the St Lucia MPA both demonstrate the value of regular monitoring.

The different MPA phases

The work conducted for this assessment suggests that establishing an MPA takes place roughly in three phases up to the point when the MPA is well on the way to institutional, technical and financial self-sufficiency.

Each of these phases can be divided into stages that can be used as criteria to assess the progress and soundness of the MPA project.

- Phase 1, the “preliminary” or creation phase, usually ends with the official creation of the MPA and covers all stages prior to project implementation.
- Phase 2 is the “pioneer” phase, when management becomes operational and the system is consolidated. It could be described as an apprenticeship phase as the MPA builds up professionalism.
- Phase 3, the “self-sufficiency” phase, is achieved when the MPA is well on the way to technical, organisational and financial self-sufficiency.

The “critical path” of activities that have to be implemented in MPAs to reach the self-sufficiency phase is rarely perceived by MPA managers. They therefore need to be helped with simple tools and methods that can put them on the right track. What follows is a proposal for a simple and flexible tool which we applied to all the MPAs assessed during this study (this “compass card” assessment tool is explained in detail in Appendix 4). The results of these assessments are given in Appendix 5 in the form of a “compass card”.

This “compass card” analysis of all the MPAs visited confirms that the usual duration of projects (4 to 5 years) is not long enough for an MPA to emerge (phase 1), to run in its management system (phase 2) and start moving towards independent operation (phase 3), since it very often takes a good 15 years to reach the last phase.

Finally, support to MPAs during these different phases requires different kinds of know-how. While the initial phases demand inventiveness, enthusiasm, an ability to handle participatory processes and a considerable talent for communication, the subsequent phases often demand more technical and managerial know-how and, in many cases, periodic expert services. These changing requirements, depending on the stage in MPA development, need to be included in the way support is provided to MPA projects. The project must be able to receive changing types of expertise and it is unlikely that the full range required could be provided by a single operator.



Fishing in a mangrove forest, Quirimbas (© C. Gabrié)

Financing MPAs in the long term

Sustainable financing for MPAs is a major problem. Once project support has been withdrawn, many well established MPAs have collapsed to become MPAs only on paper (e.g. Mohéli in the Comoros). The fact is that funds provided by international or bilateral agencies and large NGOs to finance the launch of MPAs and the investments they demand (boats, buildings, marker buoys) are only planned for a limited time. These funds come to an end with the end of each project, which in most cases means that available financing ceases altogether without leaving the MPAs with any robust solutions to cover operating costs at the very least. This does not mean that there are no enduring solutions for financing but rather that project support is often withdrawn before sustainable means of financing have been properly established on a professional basis.

In most cases, governments in developing countries barely, if at all, have the financial means to cover operating costs (and investment costs even less) once project support has ceased. Tourist taxes and fees⁽¹⁾ (when they can be levied) and other possible sources of income are not usually sufficient to cover operating costs except in a very few MPAs in a well-known tourist areas (such as the SMMA and the Tobago Cays marine park in the Caribbean, or Cayos Cochinos in Honduras).

Therefore, with the possible exception of the Caribbean where tourism is well developed, in most of the zone studied, even a steep increase in entrance fees or the introduction of green taxes are not usually enough even to cover management costs alone (e.g. rangers and fuel for patrols).

In Latin America, trust funds for biodiversity conservation⁽²⁾ have been established to provide perpetual financing for protected areas on land and at sea, either in individual countries (e.g. the Friends of Cocos Island Foundation in Costa Rica) or in a region (Meso-American Reef FUND – MARFUND⁽³⁾). These trust funds provide resources that are additional to those generated by the protected areas themselves or by public grants.

MPAs can in theory be financed from a range of sources. In reality, only a few of these are available for each site. How the necessary income to operate an MPA is to be secured therefore depends very closely on local possibilities and the activities taking place within the MPA. Income may be from taxes (rarely), activity-based (often tourism only) or from donations. In all cases, the time needed to set up permanent financing schemes and/or to develop alternative income generating livelihoods is much longer (often 10 to 15 years) than the duration of project support to MPAs (usually 3 to 5 years).

Drawing up business plans

In every case, drawing up a business plan as early as possible is an essential stage in the process. The business plan should enable comparisons between annual MPA operating costs (investments, renewals and routine operations) and annual income (resources) to cover these expenses. It should provide provisional figures for the five years to come to help the management body to ask the right questions and define the activities required to secure the funds needed to balance accounts.

Among the projects assessed for this study, virtually none had really secure financial prospects (except the Cayos Cochinos MPA in Honduras and probably the SMMA in St Lucia), and very few had a business plan to estimate their needs with any accuracy. Furthermore:

- many MPAs have few financial records, if any
- financial records are scattered and the MPA director is often unable to provide an overall account of all income and expenses.
- budgets are often based on “available” funds, and the ideal (normal) budget required to implement the management plan, as set out, is unknown (showing a financial deficit is frowned upon, especially if it is recurrent).

Accurate costings of everything required for MPAs to fulfil their missions and locating possible resources (state budget allocations, entrance fees, taxes on activities, alternative livelihoods to cover MPA costs, trust funds, etc.) to ensure sustainable financing of protected areas are an absolute necessity for all MPAs. The technical and regulatory conditions for collecting funds need to be detailed in the plan (e.g. can MPAs levy fees paid directly into its account?). The plan should not neglect the workload and costs of collecting certain detailed and complex taxes or fees. Simplicity and efficiency should be a priority.

(1) Selling crafts to the benefit of the MPA, call for voluntary donations to the visitors, private companies sponsoring, etc...

(2) See review of experiences with trust funds for biodiversity conservation at: http://www.ffem.fr/jahia/webdav/site/ffem/users/admiffem/public/Publications/1_Rapid%20Review_FR.pdf

(3) <http://www.marfund.org/indexingles.html>

MARFIN is a highly effective tool developed by the Meso-American Reef project to assess financing needs and business plans for MPAs or MPA networks, which can be downloaded in several language versions at:

<http://www.marfund.org/downloadsoftware.html>

The specific aims of MARFIN, which is designed for managers of MPAs or MPA networks, are to:

- compile field information to determine current and future management costs for each marine and coastal area category,
- supply current and future scenarios for protected marine area management at regional and local scales,
- develop a strategy to secure funds required to establish a functional MPA network in the MAR region.

At present, MARFIN is configured for MPAs in the Meso-American region, but it can be adapted for other MPAs or MPA networks.

In the future, all projects need to significantly strengthen development of their business plans, order to secure enduring and sustainable MPA financing.

POINTS TO CONSIDER FOR THE FUTURE

- testing of so-called “innovative” tools to finance biodiversity conservation (payment for ecosystem services, trust funds, biodiversity compensation, etc.)
- development of simple tools to enable managers of all types of MPAs and MPA networks to draw up business plans, by using and adapting MARFIN;
- more accurate analyses of the costs to MPAs of developing and updating business plans;
- comparative analyses of the results of MPA business plans (from national to international scale).

Alternative livelihoods (AL)

Bans on certain activities, zones or environmentally destructive methods and/or pressure on resources can result in a loss of income for populations. Sometimes, these losses are tangible in the short-term but tend to be absorbed later on⁽¹⁾.

To compensate for these losses and persuade populations to move away from activities based on unsustainable resource uses, projects often attempt to develop substitute activities, or “alternative livelihoods” (AL).

“Alternative livelihoods” or “income generating activities” are terms that are now widely used in projects. They cover very different realities, which may be the introduction of new activities, or conversion to other activities among certain operators in the zones, or improvements on existing activities for better compatibility with environmental protection. In these cases, support is usually provided to create or modify marketing systems or to improve harvesting or production methods.

These activities are generally introduced to generate income for populations (especially those penalised by the MPA). They may also be set up to help cover some of the MPA's operating costs (such as the ecotourist lodge in the Narou Heuleuk project in Senegal, from which income used to pay local employees, provide grants to surrounding villages and compensate MPA rangers).

Of the 11 FGEF projects analysed, 8 are planning to develop alternative livelihoods⁽²⁾. These activities concern alternative fishing methods as well as other sectors (essentially production and processing of natural marine resources, agriculture and livestock, crafts and tourism).

Alternative livelihoods are developed for different reasons:

- Sustainable development - reducing pressure on natural resources that are unsustainably used at present by encouraging populations to adopt sustainable methods or to switch to new sustainable resources,
- Compensation - helping those penalised by MPA projects (bands or limitations on their activities) to convert to alternative livelihoods.

Alternative livelihoods may be individual or collective.

In MPAs with particular types of potential (e.g. Narou Heuleuk project in Senegal), they may

(1) This is the case for fishermen faced with the creation of no-fishing zones, which may cause immediate losses of income that will tend to be offset by the reappearance of fish species with higher market value moving outwards from the protected area to fishing zones.

(2) Alternative fishing activities (FADs, artificial reefs, changes in methods, etc.) are dealt with in the chapter on fishing p. 58.

involve community projects that help to finance activities such as MPA patrols. In countries where state resources are limited, activities of this type can contribute to sustainable financing of MPAs while also offering alternative sources of income for local populations.

However the success of alternative livelihoods depends on numerous complex factors relating to the socio-cultural context, socio-economic conditions in the zone and market access.

Identifying beneficiaries

Alternative livelihood projects should target those who are penalised (in the short term at least) by the MPA's creation as a priority. However, projects make insufficient efforts to identify the precise people affected (often local and migrant fishermen), so that AL projects are often developed to the benefit of a wider and often wrongly targeted audience. Only the SMMA (St Lucia), IOC NMPA (Rodrigues) and OPAAL projects have specifically identified activities for displaced fishermen.

Identifying alternative livelihoods: in-depth socioeconomic feasibility studies are essential

None of the projects has made a formal study before introducing these alternative livelihoods, covering economic and commercial viability, technical and social feasibility, social and environmental impacts, risks arising from

the project, expected benefits and benefit-sharing rules.

Identification has mostly been by consultants external to the project. Their work usually includes a brief study of the social and economic context of the MPA (Caribbean, Meso-America), field surveys (Tanzania, Caribbean, Meso-America) and sometimes a workshop with the different stakeholders to identify their aspirations (Senegal). All too often, however, these studies have produced only a list of possible activities (which are often identical from one project to the next), with no checks as to whether these projects are suited to the context of the site and to actual aspirations among their populations. Financial assessments are sometimes made, but not systematically.

Yet changing the habits and traditional activities of populations takes time. Moreover, it is crucial to have a thorough knowledge of the social, economic and cultural context and of the factors that can drive or prevent such changes in behaviour. Finally, an overall view of the market and its different outlets is needed to ensure that products can be marketed under satisfactory conditions and generate enough income. Guides are available to develop these identification studies and the means to implement them⁽¹⁾.

Although thorough knowledge of the local context is essential, it is not sufficient in itself, as shown by the project in Tanzania, where several studies were carried out (successes and failures of AL development projects worldwide and in the region, socio-economic analyses of the zone) without securing a successful outcome. Despite knowledge of the context, the activities proposed were badly targeted and not profitable enough.

Identifying new alternative activities in an MPA context therefore has to be based on studies of sufficient depth to verify both economic feasibility (market surveys) and social and cultural feasibility (capacity of the population to adapt to new methods). Standard "recipes" must be avoided as experience shows that alternative livelihoods that really work have all been "custom designed" for the site and the beneficiaries identified. Similarly, rather than developing complex innovations, the best projects are those that seek to build on existing activities.

Alternative livelihoods in FGEF projects

Marine resources

- processing of seafood products: anchovy "sausages" (MAR project), oyster source (Quirimbas)
- oyster marketing (Narou Heuleuk, Quirimbas), crabs (Quirimbas)
- mariculture: fattening fish in mangroves and fattening mangrove crabs (Mnazi Bay), fish farming (OPAAL).
- fish aggregating devices (SMMA in St Lucia and MAR project)
- seaweed and fish farming (OPAAL)

Community tourism

- accommodation (Narou Heuleuk, Quirimbas, the 3 Meso-American MPAs)
- excursions and tourist guides (MAR, OPAAL, SMMA, Narou Heuleuk), training for fishermen in whale-watching (IOC NMPA in the Comoros)

- infrastructure: manatee observation tower (Narou Heuleuk), interpretation centre and souvenir shop (IOC NMPA in Madagascar, Cocos Island), glass-bottomed boat (IOC NMPA in Rodrigues)

Crafts

Quirimbas, the 3 Meso-American MPAs, Cocos Island

Agriculture/livestock/beekeeping

SMMA, Mnazi Bay, Quirimbas, IOC NMPA in Rodrigues

Other

bakery (Quirimbas), small shops, waste collection or water taxi systems for yachts (SMMA).

(1) A number of methodological frameworks can help to analyse this very complex topic: the DFID's Sustainable Livelihoods Framework (with adaptations by OXFAM, the UNDP and CARE International). IMM Ltd has developed a 'Sustainable Coastal Livelihoods Framework'. (Ireland, 2004).

In the **Narou Heuleuk** project in Senegal, the ecotourist camp set up by the project in the Bamboing MPA is a real success. It was developed with the local populations and in a brief feasibility study. However, this brief study did not clearly identify problems likely to arise with community management of the amenity, which clearly requires the know-how of a tourist professional.

Essential partnerships

Where alternative livelihoods are concerned, partnerships are essential to establish profitable economic activities. Most MPA projects are run by specialists in conservation rather than in development, and neither conservation specialists nor local populations have the know-how required to develop and accompany economic projects.

Accompanying the development of alternative livelihoods

Implementing alternative livelihood projects requires substantial training and accompaniment efforts (intensive technical assistance working closely with communities up to the medium term). In all of these projects, AL accompaniment appears to be quite inadequate. Training is usually provided when the activity begins, as well as support from the MPA management body or the project developer. However, it is usually too superficial, transitory and provided by organisations that are not familiar with development projects. AL accompaniment is not a specialist area among conservation NGOs, which often lack the expertise to carry it through. Partnerships with development specialists should therefore be sought (e.g. in St Lucia where the project brought in the St Lucia Development Bank to implement financing arrangements for the conversion of fishing equipment).

Most AL projects have not established any accounting systems for these activities. Some bookkeeping occurs but management is not sufficiently rigorous. Management training is also an important factor in developing these activities.

Community ecotourism is a particularly important issue here: most MPAs have real potential but the communities promoting these projects have few capacities for accessing markets and publicising their products; they are unaware of the demands imposed by international standards and are insufficiently trained. Community



The Keur Bamboing camp (© Océanium)

projects (especially hotels, restaurants and guides) require substantial accompaniment and monitoring over a good 10 years. Where tourist accommodation is concerned, it may be necessary to hand over management to real independent professionals, who would hand over a share of their turnover to the communities (amount and channels to be identified, depending on MPAs) but who would be responsible, especially, for promoting the product among tourist operators⁽¹⁾. Although the products clearly have potential, they are not being promoted strongly enough to attract tourists in sufficient numbers, while management and maintenance in the tourist establishments are not up to international standards.

Except for local crafts which are often of high quality, other types of small-scale industry almost always raise problems of standards and also require substantial accompaniment in matters of design, choice of products and finishing.

There is a great deal to be developed here by future projects, which will need support from specialised organisations.

Only the **Quirimbas** project is using the support of development NGOs to accompany groups involved in alternative livelihoods projects. The Quirimbas example shows that partnerships with development NGOs must be developed well ahead of the project (e.g. Aga Khan Foundation, which was approached at a very late stage). It also shows that development NGOs often have very different approaches to populations, which need to be harmonised within the AL project.

(1) This type of approach has been very successful in protected areas on land in southern Africa, where communities hand over the management of tourist accommodation, hunting concessions or wildlife ranches to private operators.

http://www.usaid.gov/our_work/agriculture/landmanagement/poverty/namibia_case_study.pdf

Time is of the essence

Developing a new activity and changing to new methods cannot be done overnight. However, the duration of projects supported by funding agencies is often incompatible with the time required for projects to produce preparatory studies and establish activities, bring operators up to professional standards and start generating secure incomes. Our assessment of the projects visited shows that it takes about 15 years for sound alternative livelihoods in MPAs to achieve the right degree of self-sufficiency (see "the different MPA phases" in the chapter on "Creating and managing MPAs", p. 51).

What scale should an AL project work on?

In most cases, several small alternative livelihoods projects are often developed within the same MPA. The scale of these projects is often too small, in proportion to the total number of stakeholders, to generate benefits large enough to prompt changes in behaviour on a significant scale (few people involved, small markets, people most affected by MPAs not always taken into consideration, project support too brief).

Micro-credit schemes

In our study sample, 4 projects have a financing plan for alternative livelihoods. Two of these include a micro-credit scheme (SMMA at St Lucia and Quirimbas in Mozambique).

The OPAAL project is planning to work with the GEF's Small Grant Program to finance each AL project up to a maximum of US\$ 50 000.

At St Lucia, financing the costs of the project to convert every fisherman's fishing gear relied on a micro-credit scheme involving (1) repurchase by the project of banned fishing gear to make up the 10 % personal contribution required from each fisherman, (2) supply by the project of a refundable subsidy covering 20 % and (3) loan of the remaining 70 % from the St Lucia Development Bank, which also monitored the conversion process. This pragmatic scheme worked very well, with technical support to the fishermen supplied by the local cooperative, which readily agreed to play its part.

In Mozambique, 2 specific types of financing were planned:

- the community development fund financed by tourists taxes;
- village savings and credit groups, in which loans are funded by members' deposits, and which are helping to secure the viability of activities once they are up and running, and even to develop other activities.

However, based on micro-credit experience worldwide, it is recommended that projects avoid creating micro-credit schemes where none already exist (the risks of defection and subsequent collapse are too great for local economic players), but rather to forge partnerships with local professional micro-credit institutions to handle all aspects concerning distribution and credit recovery from retail sales

(http://www.cgap.org/gm/document-1.9.2742/donorguidelines_fr.pdf).

Drying oysters, Quirimbas park (© C. Gabrié)



Costs of AL activities

There are no standard activity costs in this field, and AL projects obviously have to be identified and set up on a case-by-case basis. However, project costs for AL activities are in the same range, from 25 to 50 000 €. Financing for these activities must be planned in the project budgets (for example by referring to other existing projects or other development finance schemes).

Some examples of costs

Meso-America / Cayos Cochinos	30 000 € spent to date on feasibility studies and implementing ALs
Tanzania / Mnazi Bay	50 000 € spent to date on feasibility studies and implementing ALs
Mozambique Quirimbas /	25 000 € on training and installing oyster gathering systems (over 3 years)
Senegal / Bamboung	Creation of the community tourist camp: 55 000 €, using a great many local materials
St Lucia / SMMA	FGEF funds allocated to micro-credit: 25 000 €, at 0 % interest
Madagascar / Nosy Tanikely	Interpretation centre and souvenir shop: 40 000 €

AL benefits and their redistribution

Except in St Lucia, the FGEF projects are still too recent to produce quantitative information on the benefits and sustainability of alternative livelihoods introduced.

In fact, most projects only begin to introduce alternative livelihoods at quite a late stage and rarely include parallel monitoring of their social and economic impacts.

Alternative livelihood projects are usually set up with a small group (or a few individuals) within a community. The benefits are shared amongst the members of these groups or sometimes spread more widely to benefit the community as a whole. In the Cayos Cochinos MPA, for example, the benefits have financed a school boat. In the Bamboung MPA, they allow redistribution of budget allocations from the rural community authority. However, on the whole, fair distribution of income from these activities, which often benefit only a few people, is problematical. Ways of redistributing benefits to the maximum number of people affected by an MPA need to be investigated by the AL feasibility study.

To conclude, although there is still not enough hindsight to quantify the benefits generated by alternative livelihood activities in the projects, it already seems that they are often run on too small a scale and of limited impact. Only tourist activities (see chapter on "Tourism" p65) in areas where tourism is already well developed seem able to generate substantial benefits (e.g. MPAs in the St Lucia SMMA, Cayos Cochinos in Meso-America, Quirimbas in Mozambique and Bamboung in Senegal).

Examples of benefits from different AL projects

Meso-America: community restaurant in the Cayos Cochinos MPA: 10 to 13.000 € per year for 10 families.

Mozambique: Quirimbas, where a group of 14 people sell fresh oysters harvested over 10 days (about 260 kg) for 200 dollars.

Senegal: income from the ecotourist lodge in the Bamboung MPA amounted to about 50 000 € in 23 months. The money is used to pay the salaries of camp employees but also to pay MPA rangers and to support the rural community (5 to 10 % of the budget).

Tanzania: 125 households involved in alternative livelihoods projects, which have not really got off the ground as yet although some activities are promising (beekeeping, fish farming and a cashew nut plantation). The fishing gear exchange programme is reported to have earned about 1000 € for 216 fishermen in about a year.

POINTS TO CONSIDER FOR THE FUTURE

- comparison of different ways of generating and redistributing income in MPAs (alternative livelihood approaches, direct compensation, conservation agreements or pacts under "innovative" conservation financing schemes);
- analysis of different ways of extending alternative livelihoods to a larger scale to reach a more significant part of the population (financing tools or micro-credit schemes, technical support services to AL beneficiaries, etc.).

Managing fisheries

In all the projects, fishing has a vital role and populations are highly dependent on fish resources. Of all project activities, fishing therefore needs the closest attention.

Because FGEF intervention zones are in developing countries and most MPAs are coastal, this analysis essentially concerns so-called traditional and/or small-scale fishing, even though some fisheries can be very large, as in Senegal. Most are small-scale subsistence fisheries in coastal zones, extending only as far as small fishing craft, with or without engines, and modest fishing gear can operate (Meso-America, East Africa, Indian Ocean, Pacific). Fishing of this kind has usually been taking place for a long time in the same fishing zones, using techniques that have changed very little.

Small-scale fishing in these tropical zones is very difficult to manage for a number of reasons: different species are targeted in different ways by different people using a variety of methods (on foot, in boats, migrant fishermen, etc.).

In Senegal, which has the only MPA with no coral reefs, so-called "small-scale" fishing is practiced from large motorized canoes. The only

kind of industrial fishing addressed in this document is lobster fishing in the Meso-American region.

Fishing techniques are highly varied (lines, nets, fish traps, pots, etc.) and destructive fishing techniques are still being used in some zones (dynamite, poison, mosquito nets, bottom trawls, etc.).

Whatever the type of fishing and in virtually all project sites, local populations have noticed that fish resources are being overexploited, even though this is rarely corroborated with figures. Declining catches, changes in their composition and smaller fish are frequently mentioned in the few studies conducted, and by the fishermen themselves.

Fishing in coral habitats is also difficult to manage for the following reasons:

- catches are very diverse so that management based on species biology is not easy (unlike temperate zones where single-species catches are the general rule),
- landing areas are numerous and scattered, making it difficult to monitor catches,
- fishing is often the only means of subsistence for very poor communities,

Knowledge on the "reserve effect": 'short term pain for long term gain' (from Roberts et al, 2000, 2001, Wickel, 2008, project Biomex, Polunin*).

Among the MPAs, no-fishing zones (reserves, sanctuaries etc.) have already demonstrated their value for resource and biodiversity conservation and their beneficial socio-economic impacts.

Studies show that the best results are obtained when the protected area covers at least 10 to 35% of a fishing zone (Gell and Roberts 2002).

A great many benefits are described in the international bibliography:

- Protection of important habitats (spawning, shoaling and nursery areas),
- Greater overall abundance and larger average individual sizes, especially in target species,
- Improved balance in the age and size structure,
- Domino effect on the food chain, with a greater abundance of large sized

predators resulting in lower abundance of some species, usually those of medium-size, which in turn increases numbers of the latter's smaller sized prey,

- Increased reproduction potential: greater abundance of breeding adults, improved balance in the sex ratio and larger spawning volumes (although the impact of this on the overall abundance of juveniles is not clear and depends on recruitment patterns),
- Stable or better catches in adjacent fishing zones as increased numbers of adults and juveniles spill over from the reserve (although this "spillover effect" may be of limited extent), and increased larval recruitment,
- Better recruitment and establishment of juveniles,
- Less variability and unpredictability in catches,

The benefits within MPAs appear very soon (within 1 or 2 years). Spillover effects appear 2 to 5 years after protected areas are established and are reinforced as time goes on.

MPAs also help to increase biodiversity and act as gene pools and ecological reservoirs (Wickel, 2008). Some species which have disappeared elsewhere now exist only in MPAs. The increase in biodiversity at different levels in the food chain improves the overall health, stability and resilience of populations.

*- Roberts, C.M. and Hawkins, J.P., 2000. Fully protected marine reserves: A guide. WWF.

- Roberts C.M. et al, 2001. Effect of marine reserves on adjacent fisheries. *Science* 294 (1920).

- Wickel J., 2008. L'effet-réserve en milieu marin tropical – The reserve effect in tropical marine environments. Ifremer report.

- Polunin, 2002, in *Handbook of fish biology and fisheries*.

- Gell, F.R. and C.M. Roberts (2003) Benefits beyond boundaries: the fishery effects of marine reserves and fishery closures. *Trends in Ecology and Evolution* 18: 448-455

- coral reef fish have a larval life cycle and therefore have a potentially very large range of distribution; studies show that two patterns of juvenile (post-larval) recruitment coexist in coral reefs: in some species, recruitment is almost exclusively locally originated (all larvae are from the same zone where recruitment takes place), while in others, recruitment is almost exclusively exogenous (from outside the zone) and in some species, both patterns combine. This means that protecting stocks in reefs is often not enough to ensure their renewal, and that management, to be effective, has to be considered on the scale of an entire recruitment area.

Identifying penalised fishermen

When an MPA is established and before it produces tangible effects on fishing across the entire zone (usually after several years), fishermen whose livelihoods are most disturbed by the MPA creation are often the first to be penalised in the short-term. It is therefore crucial to provide them with support and to help them adapt to the restrictions and bans resulting from the MPA creation. Support should consist of practical measures in their favour, such as grants to aid conversion to different fishing methods (provided that this does not shift the overfishing problem to other fish stocks) or other activities (e.g. OPAAL, SMMA or MAR). In the most critical cases, the most deprived and worst affected fishermen who cannot easily convert may be given direct compensation or specific and non transferable fishing rights (e.g. elderly fishermen in the SMMA, p.40).

Preliminary socio-economic studies

Although they are not fundamental, as several projects have been running well without them, in-depth socio-economic studies on fishing may be useful before introducing management tools. They help to make sure that the measures proposed are consistent with possible management methods in local socio-cultural context, and therefore to gain acceptance among the population for the management methods proposed. These studies can also provide benchmarks that can be used later on to monitor the socio-economic benefits of MPAs. Finally, they help to identify the fishermen most affected by MPA creation and to whom alternative livelihood projects need to be directed as a priority. Although this point is often neglected, providing communities with feedback from study results is essential.

Co-management based on fishing associations

Co-management of fisheries must be based on representative fishing associations with enough legitimacy among the fishing community (leaders). If no such association exists, the task of organising fishing activities on a professional basis is often taken on by the project. Establishing these associations is not necessarily easy, given that fishermen are well known for their individualism, and particularly complex in the case of migrant fishermen. More or less lengthy consultations are required, depending on existing levels of organisation and awareness, before the project begins. Training and substantial accompaniment for the groups formed is essential. Meetings between fishing associations and visits to other projects have proved very useful in several cases.



Sailing off to Pemba, Quirimbas Islands (© C. Gabrié)

Developing specific fisheries management plans

Virtually all the MPAs studied have a management plan. However, only the Meso-America MPAs have developed or revised specific plans for fisheries (authorised fishing zones, fishing gear, catch sizes and periods, fishers, etc.). These plans are established on the basis of scientific ecosystem monitoring and discussions with fishermen. By supplementing the MPA management plan, a fisheries plan can be very useful to manage this particular activity. Fisheries plans do not have to be introduced immediately as they are more easily developed once fishermen have begun to perceive the benefits of the overall management measures introduced.

Supplementary management methods

The fisheries management tools used in the projects are based on different and often complemen-

tary approaches: regulations on sizes, quotas or fishing effort, reduced fishing periods (e.g. fishing bans in certain periods), allocation of exclusive fishing rights to adjacent populations, banning or reducing the use of destructive or insufficiently selective fishing gear (sometimes through substitution e.g. bans on beach seines, dynamite, etc.), using fish aggregating devices or artificial reefs to diversify habitats. In some cases, “no-take” zones are established inside the MPA, ideally to protect certain habitats like shoaling, spawning and nursery areas to reduce juvenile mortality.

Most of these methods need substantial accompaniment as they initially cause a short-term reduction in catch volumes, which often makes them unpopular among fishermen. Among the projects studied, few have tried to increase profits from fishing by looking into marketing aspects, i.e. improving product quality and/or generating added value.

In most of the projects, management measures are in fact precautionary measures that are not usually based on precise scientific data on stocks. Monitoring of fishing activities must begin as soon as possible so that management measures can be redirected if necessary.

Management methods

- **Zoning and total fishing bans** (no-fishing zones)

No-fishing zones within MPAs (reserves, sanctuaries, “no-take zones”, etc.) have already proved their effectiveness for resource and biodiversity conservation in many parts of the world (substantial documentation in international publications). However, their positive socio-economic impacts are not so well documented. No-fishing zones are increasingly seen as fisheries management tools. They are usually

more restricted zones marked out inside a wider MPA zone. They may be permanent or temporary, and occasionally rotating, although some studies have shown that rotating or temporary reserves are of limited value for long-term resource conservation.

To have an impact on fish resources, the location of these zones has to be carefully selected. In the projects, the choice sometimes rests

on scientific knowledge of the MPA (usually the most diverse zones). The choices are often made by the populations themselves, which can be valuable for awareness-raising but may not be the best solution to rebuild stocks if the location of the zone is not appropriate (sandy areas for example). The importance of protecting habitats that are vital to the lifecycles of commercial species (spawning, shoaling, nursery and migration zones) is now widely recognised and should prompt projects to work as soon as possible on identifying and protecting habitats of importance for the main commercial species.

The studies made in the St Lucia SMMA by C. Roberts clearly show the spillover effects of reserves well beyond their boundaries. However, the area concerned is not very extensive (11 km from the coast) and the reserves cover 35% of normal fishing areas. Several studies (The Biomex programme in the Mediterranean region and in some MPA in southern New Caledonia) have demonstrated a spillover effect among adult fish beyond the boundaries of no-fishing zones marked out in MPAs, but also that the effect is relatively limited outside the boundaries of the MPA itself. Given the current state of knowledge, it therefore seems wise to encourage the establishment of several no-fishing zones (where the choice of location must also take species biology into account) within an extensive MPA. When this is feasible, establishing access rights around the zones for a village or within a particular fishing territory encourages local people to adopt the zone and make sure it is respected (as in the Quirimbas Park in Mozambique or the Mohéli marine park in the Comoros).

The project studies also clearly show the effectiveness of no-fishing zones within MPAs and immediately around their boundaries (Senegal, St Lucia, Quirimbas): increases in fish sizes, changing species composition with larger numbers of higher predators, increased biomass (see box). However, the effects of no-fishing zones on catches across the entire MPA, on living standards and for fishermen is less easy to demonstrate, as most of the projects have not established any way of monitoring the effects of the zones on the scale of an entire MPA. The projects are in any case too recent to be able to measure any significant impact on fishing (except in St Lucia). It is therefore important to establish methods for monitoring fishing activities as soon as possible. If financial means are limited, it is more important to use them for fisheries monitoring than to monitor no-fishing zones (whose effects are well-known and no longer need to be demonstrated).

It is also important to demonstrate the effects of no-fishing zones to fishermen so that they are accepted rather than imposed.

All the projects have established no-fishing zones in their MPAs: SMMA in St Lucia, Meso-America, Tanzania, Mozambique, Bamboung in Senegal, Tobago Cays Marine Park in the OPAAL project, New Caledonia. Some are temporary zones (some of the sanctuaries in Mozambique), and some may change according to monitoring results (MPAs established by FSPI in the Solomon Islands and Vanuatu).

Benefits of no-fishing zones

The few figures produced by the projects confirm the results of numerous studies made across the world. They showed that it takes a certain amount of time before the effects of an MPA become perceptible in fish populations and even longer to produce tangible improvements in the living standards of fishing communities: the effects of closing off an MPA can be measured fairly soon inside the zone (in about 2 or 3 years, sometimes even less), but it takes longer to produce effects on biomass around the MPA and therefore on catch volumes. Other studies have shown that outside and around the boundaries of MPAs, the biomass spillover effect declines quite quickly (St Lucia and Biomex results in the Mediterranean), and all the more so as fishing pressure is high. The effects on production and therefore on the living standards of fishing communities take still longer to become perceptible (5 to 6 years in St Lucia, the only MPA in the sample where studies have been made). The first years are hard for fishermen who can no longer use the now closed fishing zones or certain traditional fishing methods. However, fishermen sometimes believe, rightly or wrongly, that fishing has improved around protected areas. Surveys show that the more closely people are involved in creating and managing an MPA, the more they perceive the effects as positive.

Results from some of the sample projects show the following effects.

- **Bamboung MPA (Senegal):** after 3 years, effects are perceptible within the MPA, essentially on the composition of populations, the structure of the food chain (3 to 4 times as many predators) and individual fish sizes (larger average sizes); however, effects on species richness and biomass are less perceptible. There is no monitoring around the MPA. 52% of the fishermen believe there are more fish around the MPA, while 79% of the park delegates, who are more closely involved, perceive positive effects.

- **Mnazi Bay Marine Park (Tanzania):** monitoring took some time to establish and has produced no quantitative results as yet.

However, fishermen are saying that they are beginning to see positive changes in resources: an increase in catch and fish sizes and improved environmental conditions for other resources (corals and mangroves). The perception among scientists is that biomass is increasing but not species richness, and that the change is mainly due to the ban on dynamite fishing.

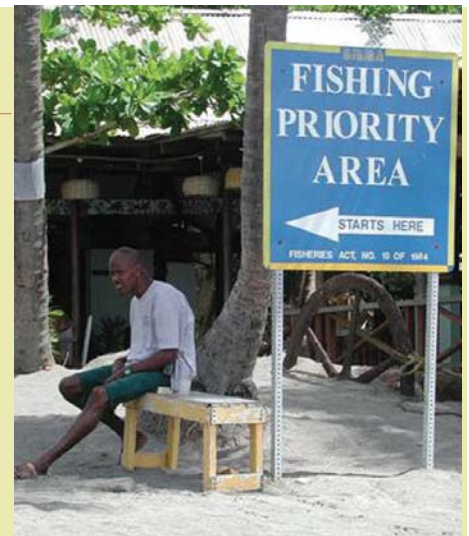
- **Quirimbas National Park (Mozambique):** results show significant differences in terms of biomass, individual fish sizes and species richness between the sanctuary (where they are clearly higher, especially among higher predators) and adjacent fishing zones. The average catch per unit effort (CPUE) is also higher in the sanctuary (8.13 kg/day) than in adjacent zones (0.48 kg/day). Most of the people interviewed confirm the positive impact of the protected area. Some fish species which had disappeared about 20 years ago are now reappearing, like parrotfish (*Sparisoma abilgaardi*) and mullet (*Mugil liza*). Fishermen and park officials also agree that oyster sanctuaries have produced higher seasonal yields. When the no-fishing zone in the Quirimbas Park was temporarily reopened after 6 months of closure, records catches were reported (2 tonnes of fish in 3 days), which had a considerable impact on all of the village chiefs in the park who were invited to the opening. Since then, most of the fishing committees have become convinced that sanctuaries are useful and want to establish others. Even without the backing of scientific monitoring, fishermen say that catches have improved.

- **St Lucia (created in 1995)** is where analyses have the most benefit of hindsight (Roberts, 2001, 2005 and 2006) :

- after 3 years, biomass had tripled in 5 commercially important species in the reserves and doubled in adjacent fishing zones;

- although the data show that stocks have doubled or even tripled, the effects are still barely perceptible in catches (Gell et al, 2001) .

- after 7 years (2002) total fish biomass



Delimitation of MPA's zones on the ground (© SMMA)

had more than quadrupled in the reserves and tripled outside the reserves in the fishing zones, especially because of the increase in herbivorous biomass; this increase in biomass does not seem to be affected by either habitat characteristics or degradation.

- In 5 years, the CPUE for traps around the reserves increased by 46% to 90% depending on the size of the traps;

- fishermen are convinced that the MPA is effective and they have continued, well after the end of the project, to invest time, energy and resources in consultation meetings, financing and management of FADs.

- **Moorea MPA (CRISP):** after 1 year of monitoring using the BACIP method (Before-After-Control-Impact Pairs), no MPA effects are yet perceptible.

However, as no systems were implemented early enough to measure these benefits, none of the projects has supplied any quantitative results as to impacts on fishing livelihoods.

* Roberts, C.M., et al, 2001. Effects of marine reserves on adjacent fisheries. *Science*, 294: 1920-1923.

Roberts C.M. et al, 2005. The role of marine reserves in achieving sustainable. *Fisheries. Phil. Trans. R. Soc. B* (2005) 360, 123-132

Gell, F et al. 2001. The Fishery Effects of the Soufriere Marine Management Area, 1995/6 to 2000/1. UK

In sites where monitoring is too recent to show any quantitative change, surveys on perceptions among fishermen are a useful way of assessing effectiveness.

Several questions, all concerning research, need to be raised on ways of sustaining the functions of these zones, protecting sensitive habitats as much as possible, restoring marine and fisheries resources inside MPAs and ensuring a strong enough spillover effect to meet the needs of local fishing communities. The many questions raised both globally and locally, and currently being researched, include the following:

- how many new fishing zones should be established in an MPA?
- what is the minimum critical size for these zones?
- where should these zones be located and how far from each other?

To answer these questions, scientific studies should be encouraged in order to describe the structure of species assemblages, the regional structure of fish populations within them and the extent and scale of larval and/or adult dispersion in local recruitment.

• Management roles based on traditional customs

Several traditional fishing management systems have been documented (especially in the Pacific), some of which are still active: fishing in accordance with species life cycles; catches and fishing zones allocated to fishermen depending on their customary social status, customary taboos (closure) on certain species and zones in Melanesia, "rahui" in French Polynesia (temporary bans on a particular resource), and certain forms of customary rights over territories.

The MPAs in the South Pacific (CRISP) have incorporated these traditional systems into modern rules and management systems, which has greatly facilitated their acceptance by local populations.

• Exclusive access rights to resources or fishing zones

The importance of exclusive access rights to marine waters is now recognised as a way of avoiding the adverse effects of free access to collective resources and they are increasingly being adopted, often on the basis of existing "territories" (as in the South Pacific). Doing so means registering both fishermen and their boats. In some cases, as in St Lucia, restricted access to a reserved marine zone has been given to some elderly fishermen who were unable to

switch to other activities. These rights are not transferable and cease to exist when the beneficiary dies.

Although exclusive access rights have proved their effectiveness as a way of reducing pressure in MPAs and managing conflicts, it is important to define their scope with great care and to include all those who have traditional fishing activities in the zone or to reserve fishing areas for them. In at least two projects, the MPA perimeter excludes a number of important fishing communities who were used to fishing in the park area (neighbouring or migrant fishermen) but were not offered any alternatives. Very few projects have developed solutions for migrant fishermen. Taking their needs into account may seem very complex and costly, but ignoring them inevitably turns them into poachers.

Alternative fishing activities

Destructive fishing methods are banned in all the MPAs. Several projects have not only banned them but also attempted to substitute other fishing tools and methods: nets with a larger mesh size (Mnazi Bay), FADs (SMMA, Cayos Cochinos), artificial reefs (Cayos Cochinos). These methods are designed to limit capture of juveniles, to encourage coastal fishermen to use easily exploitable resources in the open sea (pelagic fish, including tuna) and to move fishing effort outwards from the coast (and from overexploited reef zones) towards the open sea.

In most cases where fishing is mainly coastal, several preparatory stages are needed before introducing these methods:

- in some cases, the provision of seagoing boats, which requires substantial funding (e.g. Tanzania and St Lucia),
- prior discussions on methods (especially financing) for managing fishing gear and equipment during the project (micro-credit schemes in St Lucia) and afterwards,
- assessments of stocks in some cases,
- assessments of the impact of new methods to ensure success or identify potential problems (St Lucia).

Acceptance of the new techniques can take time and initial failure does not mean that all is lost, as it can eventually lead to success (as in St Lucia where the – non-participatory – launch of the programme failed, with equipment stolen or vandalised and rivalry between villages, and where it took several years to convince the fishermen, who are now happy with the new methods).

Substituting fishing gear is not so easy in industrial fisheries, as it requires a sectoral approach and decisions at policymaking levels that often take a great deal of time, as in the case of the Meso-America project for industrial lobster fishing.

The lessons learned from experience in **St Lucia (SMMA)** are transferable to other projects and to other alternative fishing methods:

- the importance of raising awareness amongst fishermen, explaining the principles of the methods selected (different nets, FADs, artificial reefs), and training in fishing techniques suited to these methods,
- the importance of taking enough time to develop technical solutions with fishermen, involving them in choices from the outset (of fishing gear, type of FAD, sites for their location) and in building and setting up the equipment in the chosen sites
- the importance of “personalising” the ownership of FADs and artificial reefs to encourage fishermen to adopt them, avoid conflicts (one FAD for each fishing community or village) and establish access rules for other fishermen.
- the importance of signing agreements with the fishermen who receive the new equipment.



Women fishing with mosquito nets, Manzi Bay, Tanzania (© C. Gabrié)

Fisheries monitoring

As well as basic social or economic studies that characterise fisheries to help define the most appropriate management methods, regular monitoring of fishing is fundamental to long-term measurements of trends in fisheries and MPA impacts (catches, economic benefits for fishermen and fish stocks). Some projects (Quirimbas, Meso-America) have developed interesting monitoring methods and the corresponding databases. The facilities to be developed are relatively costly and need to be assessed at the beginning of the project so that monitoring does not stop at the end. Monitoring needs be calibrated to suit available human and financial resources, and should be carried out in collaboration with the Fisheries Department

Surveillance

To ensure that MPA zoning, especially as regards no-fishing zones, and agreed bans on unsustainable fishing methods are appropriate, surveillance is crucial and has to be permanent (see “MPA creation and management” p.43).

Strategic alliances

Where industrial fishing is concerned, introducing and enforcing management rules is even more difficult than in small-scale fisheries and only 2 FGEF projects have addressed the issue: the Meso-America project for lobster fishing and the Cocos Island project in Costa Rica for semi-industrial long-line fishing. Strategic



© JR Mercier

Fisheries eco-certification demands specific conditions and feasibility needs to be carefully assessed before projects are set up. The process often takes a long time and when the necessary conditions are not present (knowledge of the resource and existing links with fishermen) eco-certification is unlikely to be completed within project schedules.

In **Meso-America**, long-standing lobbying efforts by the WWF and several consultation meetings eventually produced agreements with industrial lobster fisheries that have resulted in the first onboard fisheries observation operations and identification of seven fishing banks and as well as the most suitable lobster pots (which capture commercial sizes and release juveniles). Alliances have also been concluded with local restaurants, prompting them to improve practice, and with DARDEN, an American catering chain of more than 1700 restaurants in the USA, which has undertaken to buy only lobsters of legal size.

alliances with the different stakeholders (administration, fishing committees, surveillance organisations and consumers) are among the most effective means adopted by these projects to encourage stakeholders to participate in protection efforts or to abide by rules of good practice. Alliances with the industrial sector often take a long time to become established, as industrial players are not keen to publicise their results, or to comply with rules. Alliances of this type can be facilitated when the person in charge of negotiations is also from the industrial sphere (Meso-America example).

International NGOs (like the WWF in the Meso-America project) have capacities that are lacking in other agencies (states, local NGOs and research institutes) to organise large-scale international consumer campaigns. Some projects have also won initial successes through lobbying strategies at different levels (local to international) among downstream sectors (from wholesalers to final consumers). The aim is to encourage procurement agencies to purchase seafood products that comply with legal environmental standards in terms of size and fishing methods, in order to encourage both small-scale and industrial fishermen to adopt responsible methods in their turn.

POINTS TO CONSIDER FOR THE FUTURE

- testing and comparing methods for monitoring different types of fishing activities in and around MPAs (protocols and costs);
- developing and testing working methodologies with migrant fishermen and industrial fisheries (including eco-certification);
- analysing links between MPAs and their role as a fisheries management tool;
- synthesize lessons learned from alternative livelihood development methods providing realistic, competitive and suitable solutions fitting with the specific needs of fishermen.

Managing tourism

Tourism is recognised as one of the most promising activities for protected areas. Its role can be positive (financing for MPAs, awareness-raising among tourists, landscape conservation) as well as negative (degradation and pollution, high demand for natural resources including water, food and space, and cultural impacts).

Tourism is considered to hold out the most promising prospects for developing and financing MPAs. It is increasingly a core concern among funding agencies and management bodies as well as in projects. The stated objective is to generate finance for MPAs and local populations (SMMA, Quirimbas, OPAAL, Narou Heuleuk, Andaman Coast). The Quirimbas National Park project has stated that "tourist development should ultimately cover part of operating costs and generate positive impacts for local populations". This choice is largely enshrined in the different plans developed for management, business and tourist development.

There are major differences in context between Thailand, Moorea, St Lucia and St Vincent & the Grenadines, which receive over 100 000 visitors each year, the Quirimbas, Cocos Island and Bamboung protected areas which receive 2 to 3000 per year and the MPAs in Meso-America or Tanzania, which receive less than 1000 per year. It is therefore unrealistic to consider that tourism will always be able to finance all the needs of local populations and all MPAs.

There are two main kinds of intervention in projects, which are reflected in the different positions, roles and responsibilities taken up by management bodies:

- preventive and accompanying activities for tourism development: anticipating and reducing environmental risks and impacts (impact studies, development of good practice, information, awareness-raising, studies of carrying capacity, etc.) and use conflicts (usually between fishing and tourism);
- encouraging the development of sustainable ecotourism, with management bodies driving the process (as in the Quirimbas with the creation of a "favourable environment for investment in and promotion of the park" or in Thailand), and even working directly as a community tourism operator (Cochinos and Bamboung MPAs).

Projects are increasingly linking preventive and incentive activities, especially those co-financed by the FGEF (prevention) and AFD (incentives).

In the experiences we found, tourism had different impacts and local financial repercussions:

1) High-end and luxury tourism (Mozambique, Moorea, Caribbean): few tourists but substantial use of natural resources increasing environmental impacts, populations sometimes kept apart (Quilalao in the Quirimbas), few jobs (due to lack of local skills), few benefits locally as profits usually leave the country; tourism often promoted by funding agencies;

2) Mid-range and low-cost tourism (Thailand, Caribbean): mass tourism with considerable impacts on the environment, positive socio-economic impacts in terms of employment but negative in terms of social effects, of great value to MPAs as it generates the largest amounts of tax based financing,

3) High-end eco and/or responsible solidarity tourism (as in Guludo or the Quirimbas in Mozambique): numerous direct, immediate and long-term jobs (not only for hotel construction), minimal environmental impacts, benefits for adjacent villages, direct benefits (jobs) and indirect benefits (development projects),

4) Community tourism: (Mozambique, Meso-America): direct employment but for few people, little environmental impact, direct and immediate benefits for populations.

5) Scientific tourism (Meso-America): involves hosting research teams and providing the necessary infrastructure and services - few impacts and obvious benefits in terms of support to MPAs.

Tourism and hotel developers also vary according to projects: professionals in Thailand, Mozambique and the Caribbean, local communities in Meso-America and Mozambique, MPA managers in Senegal and Meso-America.

Environmental problems arising from tourism

Environmental problems arising from tourism are related to poor hotel integration within landscapes, to land use and to pressure on real estate, with a particular risk in MPAs of prompting high capital gains in some areas with the resulting negative impacts of real estate speculation. Other problem areas are land sealing along the coast, amenity construction (deforestation and sedimentation) and operation (hotels, golf courses, etc.), leisure activities (reef degradation by trampling, diving and specimen collecting). Tourism greatly increases drinking water consumption in sites where it tends to be scarce, and also considerably increases effluent and waste as well as natural resource and energy consumption (according to a study by the Accor Group, power consumption in a main residence in France averages 190 kWh per person, while a Sofitel hotel uses twice as much per person - 380 kWh). There are also important overarching issues, especially the impacts of air transport and social problems (drugs, alcohol, prostitution, loss of respect for elders, etc.).

The AFD/FGFE project in Thailand is a unique example in the portfolio, as it is almost exclusively dedicated to developing sustainable tourism in a country where mass tourism is the rule, through a series of original activities (dedicated funds and labelling). This project will probably produce a great many lessons but it has only just begun and none can be drawn as yet.

Because of the wide variety of different situations, it is difficult to draw general conclusions from project experience in this area.

Benefits for MPAs and populations

Tourism is always an opportunity for MPA development, and has been of considerable benefit to several protected areas and the local communities living there. In a few cases, MPAs are almost entirely financed by tourism (small MPAs like the SMMA in St Lucia and Bamboung in Senegal). In some cases, tourism is virtually the only source of financing while in others, it is not even an option in the short and medium term, as the MPAs are too remote or do not have the required infrastructure and safety conditions (e.g. Mnazi Bay). In these cases, other sources of financing must be sought, such as trust funds or payment for an environmental services (see chapter on "Financing MPAs in the long term" p.52).

While all those concerned place their hopes in the financial benefits of tourism, the timescales involved vary considerably. Local communities expect quick results, private operators cannot expect to balance their accounts for 3 to 5 years (depending on countries and types of hotel amenities), while many more years are required before tourism can make MPAs financially self-sufficient, even if it can bring substantial benefits much earlier. MPA income from tourism is of three types in the existing projects:

- Entrance fees to MPAs, ranging from free access to 10 US\$, which is very low compared to entrance fees for some parks on land (20-60 US\$ in Tanzania and 9-18 US\$ in South Africa for example),
- Fees for activities (usually mooring sites, snorkelling, yachting and scuba diving),
- Hotel concession fees (Quirimbas).

Projects must plan for equitable sharing of tourism revenues, and the benefits must be measured (penetration rate of income generated). Taxes and fees are a source of financing for MPAs, but local communities must also be able to benefit economically. Several projects in the portfolio provide for the redistribution of benefits to populations: in the Bamboung community MPA, 1/3 of the income from the ecotourist camp has to be transferred to the rural community; in the Cayos Cochinos MPA in Honduras, tourist fees are used to finance community projects; in the Quirimbas Park in Mozambique, 20% of the product of tourist taxes and 30% of the profits from community tourism are paid into the Community Fund.

Methods for redistributing tourist benefits have to be studied on a case-by-case basis. The creation of a community fund is a promising solution as communities are able to keep some of the park's profits and manage them directly.

In every case, it is therefore important to assess the potential benefits generated by tourism and, as far ahead as possible, to clearly define the share to be redistributed local populations and the share to be used to finance MPA operation in the long-term (with reference to the MPA business plan, see chapter on "Financing MPAs in the long term" p.52).

Scientific tourism, which involves hosting scientists who pay for their stay to carry out field studies in an MPA, has not been developed to any great extent in the projects (Cayos Cochinos in Honduras, Andavadoaka in Madagascar), although it can be highly profitable both financially and in terms of strengthening human resources for research and monitoring. However, it requires investments on a scale that depends on the type of research

Entrance fees to MPAs in the projects

Sites	Entrance fees	Number of tourists per year
Cayos Cochinos (Honduras)	2 - 10 US\$	About 200
SMMA (St Lucia)	0 but fees for activities	500 000
Bamboung (Senegal)	0	2 000
Tobago Cays (St Vincent & Grenadines)	5 US\$ /day plus fees for activities	150 000
Moorea ((French Polynesia))	0	170 000
Cocos Island (Costa Rica)	25 US\$	About 3000
Mnazi Bay (Tanzania)	5-10 US\$	About 1000
Quirimbas (Mozambique)	8 US\$	3300
Thailand	4 US\$	265 000 max in 1 park

anticipated and on the qualifications of the researchers (e.g. Cayos Cochinos where a scientific station has been developed in partnership with American universities, or Blue Venture in Madagascar with more modest facilities). Scientific tourism is undoubtedly a valuable opportunity for MPAs, which projects should take into consideration.

In **Cayos Cochinos**, scientific tourism is earning about 200 000 US\$ per year (500 to 600 volunteers each year, each paying 400 \$ to the management body). Site entrance fees are financing community projects.

On **Cocos Island**, 2000 divers spend 4 to 5 000 US\$ each for a week's diving, generating an annual turnover of about 10 million US\$.

In the **SMMA**, the economic value of tourism associated with coral reefs has been estimated at 72.2 million US\$; tourism accounts for 94 % of the reef's value.

At **Bamboung**, the substantial revenues generated by the ecotourist camp are used to pay staff and rangers and to finance MPA operation. Quarterly income has sometimes generated a surplus which is handed over to the rural community (1/3 of the income).

3 300 tourists visited the **Quirimbas** park in 2006, which now has a hotel capacity of 142 beds. 5 sites, 3 of which are in the marine part of the park, have community tourist facilities.



The NEMMA marine area in Antigua (© Projet OPAAL)

On Ibo in 2007, a total of 137 hotel nights generated income of about 1000 €, which doubled or trebled family incomes. At Ningaia, in 2007, park visits brought in about 200 US \$ (107 tourists in 6 months). Besides direct income from various fees (around 60 000 € per year at present), sales of local products and materials for food and construction also generate indirect benefits. The five tourist operators in the park

employ 222 local people, 42 other Mozambicans and 32 foreigners. At the Matemo hotel, 80% of the staff (72 people) are from the neighbouring village. The Guludo Lodge has 40 local staff, including 9 women, whose salaries benefit a third of the 1500 villagers. It also provides work for 8 local fishermen and 2 tailors. 20% of the income from the Quirimbas Park is paid into a community fund.

Community tourism

The projects have had some successes with community tourism but several lessons can be drawn from their experiences: small-scale projects can be developed by the communities provided they are well trained and accompanied to achieve the required standards, which may take several years (see chapter on "Alternative livelihoods" p.53).

When projects decide to develop community tourism, they should work with specialists in the sector in order to develop not only tourism products as such but also, and especially, marketing aspects, particularly among tour

operators who specialise in the type of tourism that MPAs can offer, as these small-scale projects generally do not have the means to advertise themselves abroad.

Management and co-management: who does what?

Park management responsibilities with regard to tourism need to be carefully thought out. It may be questioned whether it is really the responsibility of MPA management bodies to address tourist development, as in the Quirimbas park or the Bamboung MPA, or whether they should

work through partnerships with professionals, as in the case of alternative livelihoods projects. Projects for economic activities would in this case be built up from the start with the management body and its specialised partners (tourism, ALs, etc.)

The example of the Bamboung community MPA shows that while some tourist projects can be initiated by MPA managers, they cannot feasibly ensure their long-term development. Again, this should be handed over to tourist professionals, both to run the activity and to market the product among international and specialised operators.

Tourist operators have a key role in several MPAs, and co-management solutions with these professionals need to be further investigated and strengthened. Although tourist operators are usually represented on management committees, few MPAs in the portfolio have developed robust co-management involving charters or agreements with operators. The project experience in Thailand

should offer a great many lessons on this particular topic, as should the Quirimbas Park project which has recently begun to move in this direction.

Setting out conditions governing the working relationships between communities and tourist operators in the Quirimbas Park management plan seems to be an example worth following. Provisions include a contract drawn up between operators and the local communities concerned, to define conditions of access to real estate and rules for site management and benefit sharing.

Training needs

Tourist development is recent in some of the project countries, so there are considerable training needs for local employees and managers. The role of projects in this capacity-building area needs to be defined, but it is highly recommended, again, to build partnerships with professionals (support to existing training centres, links with catering schools in the region when they exist, etc.). Some more highly qualified jobs (guides, canoeists, etc.) may require training and official or professional approval.

Tourism offers significant opportunities to create market outlets for local products, provided that quality is rigorously monitored and local operators are accompanied in processing or manufacturing products to meet tourist standards and expectations (e.g. crafts or fresh produce such as oysters supplied by an MPA in Casamance, Senegal, or the oyster sauce produced in the Quirimbas). There is a very broad field here for developing a range of short-distribution income-generating activities provided they are based on sound training, which will often require long-term mentoring.

Developing good practice

Good practice in tourism must be developed at every level: in relationships with local communities, in choosing and planning tourist development sites (see guide on development in coral reef environments published by the French Ministry for Ecology), where preference must be given to local materials and labour, in planning for the operational phase (water, waste, etc.) and in planning tourist activities (sailing, diving, wildlife tours, etc.).

Some projects have developed good practice guides for tourists and tourist professionals (e.g. Cocos Island National Park and MAR). A number of original experiences deserve to

Guludo's ecolodge, Quirimbas (© C. Gabrié)



be highlighted. For example, several hotels in Fiji have developed concepts involving tourists (physically or through donations) in restoring coral reefs, while the Guludo lodge in the Quirimbas has produced a guide for hoteliers on responsible seafood provisioning

Raising awareness

Few awareness-raising activities for tourists have been developed to date, except in some MPAs like Cocos Island or the SMMA (brochures and videos on rules and regulations, visitor donations and diving guides). These are very effective in terms of awareness-raising and there is a great deal of potential to create similar material.

None of the projects in the portfolio have developed diving trails, for example, although these are an excellent way of raising awareness among tourists and local populations (especially children). Installing them raises no problems today, and there is scope for original features (such as snorkels with built-in audio-guides providing music and commentaries during visits).

Awareness-raising activities targeting operators are also rare, except in the Quirimbas Park and Thailand projects, where this is one of the main objectives, and in the CRISP programme where reef restoration work is undertaken in partnership with hotels (Fiji).

MPAs are also recognised as educational tools and this aspect could be strengthened when designing projects, drawing on experiences with schools, as in Tuvalu under CRISP (restoration), in the SMMA in St Lucia, or in the Bamboung community MPA where awareness raising for thousands of school-children is an integral part of the project.

Eco-certification

Although provided for in the CRISP programme, eco-certification is only being undertaken in the Andaman Coast project in Thailand. The country already has substantial experience in the area, which could be built on to produce a guide for future projects once the Andaman Coast project has progressed further.

More modest but equally interesting and important initiatives may be developed at a smaller scale, as in the Quirimbas Park where the Guludo Lodge took has created a label ("green stamp") awarded to hoteliers who buy products from sustainably managed sources.

Not enough planning and not enough monitoring

Although tourist development is often highlighted as an important issue, few projects have developed the necessary databases and monitoring:

- Few MPAs have produced tourist development plans, except Quirimbas and Mnazi Bay. These need to be carefully thought out to ensure that they are both ecologically and socially sustainable (identification of sites, activities, carrying capacity, taxes, regulations, etc.).
- Business plans setting out working hypotheses on anticipated tourist revenues to help cover MPA budgets were virtually nonexistent in the sites visited.
- Carrying capacities are rarely assessed. Only the Cocos Island project has assessed and established the carrying capacity of all its diving sites and will be starting to revise its rules on diving accordingly (number of dives and diving "buddies" per site).
- Tourist impact studies are equally rare (2 impact studies made in the Quirimbas).
- There are no programmes to monitor tourist traffic and the resulting impacts, except in the Cocos Island project, which is monitoring the impact of marine tourism, and the SMMA project which has investigated some effects (of diving for example). Monitoring of tourist impacts must be regular and based on appropriate criteria.

POINTS TO CONSIDER FOR THE FUTURE

- Assessing the effects of MPAs on real estate rental prices in the peripheral and coastal zones (approaches made in the SMMA and Cayos Cochinos MPAs);
- Developing ways of including cultural and social management aspects in tourism management plans and activities (good practice guides, highlighting the cultural as well as the natural heritage etc.), educational opportunities (links with schools);
- Seeking ways of strengthening a sense of pride among citizens in the project countries for their natural heritage and their MPAs (can policies be devised to encourage local populations to visit MPAs and regain a sense of ownership of these natural areas?). Although information on the subject is sparse or limited, the general impression is that most visitors to MPAs are foreign tourists (even more so when equipment and a minimum of training are required, e.g. scuba diving).
- More accurate assessment of the impacts of different types of tourism on direct and indirect employment, especially among community tourism facilities (high local unemployment but inadequate standards and quality and little professionalism) compared to professionally run facilities (better standards but generating little and mainly subordinate local employment).
- Tourism projects in MPAs are increasing in importance and have opened up a wide range of potential research and applications. It is important to continue building on experience in this area and to provide good practice guides for project promoters.

Scientific research and monitoring

A balance needs to be found between scientific studies and field activities

Scientific studies have been predominant in 4 projects: Mnazi Bay in Tanzania, CRISP in the South Pacific, the Meso-America project and Cocos Island in Costa Rica. Elsewhere, management decisions have been made with virtually no prior studies and sometimes with little scientific knowledge.

This study was not able to analyse how and how far scientific knowledge is used by management bodies to decide on or revise MPA management guidelines.

Scientific studies are essential to develop appropriate management methods and zoning plans. They are also essential to establish the foundations (benchmark studies) and methodologies (sampling protocols, etc.) for biological and socio-economic monitoring, which has to begin at the earliest possible stage to measure MPA impacts reliably. Studies in the social sciences are also indispensable to understand the social and cultural context, and therefore need to be given much more scope than is usually the case compared to biological studies. Fisheries monitoring in particular is inadequate to ensure sustainable management.

In all cases, experience shows that it is crucial to strike the right balance in projects, according to

available human and financial resources in particular. If there are sufficient financial resources, every type of scientific research must be undertaken; otherwise, and especially in the early stages of an MPA, research should take second place to practical actions in the field and activities aiming to secure the involvement of populations.

However, because so few basic scientific studies on fishing and fish resources are made, fisheries management in MPAs must obey precautionary principles. These studies are essential to support rational management of MPAs and to monitor their impacts on fish stocks. Studies on the structure of fish populations at different scales (from local to regional) are an essential foundation for effective management plans and must be facilitated by the projects.

In all cases, research work undertaken in these projects must be geared to operational applications directly supporting MPA management. Studies must be required to produce a pragmatic summary, with guidelines that can be directly applied by the management body.

Once they are published, results must be transferred to international data bases (see Part 2 – “7 : scientific research and monitoring of MPA effects”). Results must also be communicated to local populations and stakeholders in a suitably didactic and understandable way. At the end of the project, and even along the way, a bibliography of all scientific studies and publications should be supplied, as well as a general summary of the scientific results acquired by the project.

All the projects have helped to strengthen scientific knowledge on marine biodiversity, but 3 have been particularly active in this area:

CRISP: summary report on the corals of New Caledonia listing 310 species and 74 genera in 17 families; 115 crustaceans identified in the islands of Wallis, Futuna and Alofi. 284 algae in the Solomon Islands and Vanuatu (2 red alga species previously unknown to science and one new genus and species); a large number of reef organism extracts (sponges and algae) have proved of interest as active pharmacodynamic substances.

Mnazi Bay: a study by Obura (2004*) lists a total of 258 coral species (59 genera and 15 families) in the park and a total of about 150-200 echinoderms, including 40 sea cucumber species (Richmond, 2005**). 80 fish species have been listed, mainly in seagrass beds and mangroves, which is a fairly low figure but adds to the list of fish species found in the park. An inventory of algae has also been made (284 species).

On Cocos Island, several research campaigns have identified about 300 fish species (10% endemic), over 600 marine mollusc species (75% endemic), over 800 insect species (15% endemic), over 100 bird

species (13 resident and 3 endemic), 5 freshwater fish species (3 endemic) and about 400 plant species (7% endemic).

Socio-economic studies have also been extensive in the Mnazi Bay project and CRISP programme.

* Obura, D. 2004. *Biodiversity Surveys of the Coral Reefs of Mnazi Bay Ruvuma Estuary Marine Park, Tanzania*. IUCN EARO, Nairobi. 77+pp.

** Richmond, M.D. & Mohamed, A. 2005: *Assessment of marine biodiversity, ecosystem health and resource status of intertidal (non mangrove) and sub-tidal (non-coral) habitats in MBREMP*; IUCN, Nairobi.

Monitoring MPA effects has a key role but must be scaled to available means and objectives

Monitoring has a key role in MPA management, supplying essential information to support management decisions and to measure their impacts.

Monitoring in this case means regular monitoring and assessment over time of the same parameters in the same sites in order to measure changes in these parameters over the long term.

Several kinds of monitoring have been introduced in the project MPAs:

- biological and ecological monitoring to measure changes in environmental health (mainly reefs), species populations and biodiversity depending on these habitats;
- socio-economic monitoring of communities living inside and outside MPAs to identify the different uses of space and resources, perceptions, pressures and benefits of the MPAs;
- monitoring of the reserve effect of no-fishing zones, sanctuaries and other reserves (see chapter on "Managing fisheries" p.58) ;
- monitoring of fishing activities (see chapter on "Managing fisheries" p.58) ;
- monitoring of management effectiveness (see chapter on "MPA creation and management" p.43) ;
monitoring of flagship species (turtles, marine mammals, birds, etc.).

Some of these monitoring operations, which contribute to worldwide surveillance networks, were already in place in MPAs before the projects began (GCRMN, ReefCheck, AGRRA, SocMon). Others have been established by the projects themselves (e.g. reserve effect and other fishing parameters).

Whether they are run by scientists, management bodies or populations, the different types of monitoring operations are all necessary as their purposes complement each other:

- guidance for management decision-making
- alerting for decision-makers
- awareness-raising.

Some monitoring systems are highly scientific and require substantial financial means and highly qualified personnel, while others are designed for non-specialists. The standard and quality of the information produced is therefore highly variable.

In fact, monitoring has to be adapted to each of the three purposes. International monitoring systems designed to report on the state of health of coral reefs worldwide and to alert decision-makers are often ill-suited to the specific needs of local MPA managers.

For MPAs, the type of monitoring (strategy and sample size, intervals, parameters or indicators) has to be designed to suit the specific objectives of the management plan so that managers can assess whether they are on target or not and revise their methods if necessary (see chapter on "MPA creation and management" p.43).

As they do not produce the same results, it is worth combining results from detailed scientific studies with those from less demanding monitoring carried out by management bodies or volunteers.

- Detailed scientific monitoring is necessary to provide a sound basis for comparisons. As it is costly, it may be carried out at long intervals, for example every 3 to 5 years.
- Monitoring by management bodies should cover a denser network of stations to give a more accurate idea of changes over shorter intervals (once or twice a year to include seasonal variations), and should be flexible enough for them to react quickly should a problem arise (adaptive management). Park rangers with appropriate training should be



Sailing off to Pemba, Quirimbas Islands (© C. Gabrié)

able to handle these monitoring operations using suitable methods.

This type of monitoring should be on a scale that suits MPA capacities for data analysis and processing (cf. SMMA, which produces a great deal of data that cannot all be processed).

Local involvement (participatory monitoring) is important for awareness-raising and extends operations to a larger spatial scale, but requires sound, regular training as well as quality control.

The most important point in monitoring is to use the same method, whatever it may be, and the same stations, over a long period of time in order to produce long time series from which changes can be measured. Our study shows that many projects do not have data series that are comparable over the long term.

To be able to measure the impacts of an MPA project, biological and socio-economic moni-

sophisticated tools in countries that lack the required skills will generally fail (e.g. Tanzania).

As far as possible, the data should be processed within the MPA itself, which means that the necessary skills must be available to the management team. When the data are processed externally, it is essential to provide the information to managers (e.g. Quirimbas, where the data are processed by the WWF in Maputo, or the Meso-America project where some of the data are processed in Mexico). All data and databases produced during FGEF projects must be communicated to the FGEF. Compiling all the data for overall analysis purposes will always be of benefit.

It is very important to report monitoring results back to local populations and especially to those who helped to collect the data. Results must be presented in a didactic way and in plain language to suit the audience.

Few of the projects process the results of monitoring and scientific studies for dissemination, except when the scientific studies can be published, although they are usually in the form of reports ("grey literature") that are not particularly well presented. Documents synthesizing experiences on all the project activities should be systematically required by funding agencies at the end of each project. The document may be a CD-ROM compiling all of the documents produced or a single document summarising the main results and suitably presented for dissemination purposes.

Finally, it is vital to secure financing, in reasonable proportions compared to the cost of creating and operating the MPA, that will ensure that monitoring can continue. The cost should be included in the MPA business plan (see chapter on "Financing MPAs in the long term" p.52).



MPA training workshop, Meso-américan reef project (© A. Medina)

toring has to begin as early as possible, against benchmark data produced before the MPA was established (which is rarely the case). Given the abundant literature on methodologies, there is no need to finance new studies to develop new methods. However, current methods need to be adapted to the local MPA context, with the help of specialists (especially in socio-economic fields).

Worldwide databases have been developed in parallel with international monitoring (e.g. Reefbase, Fishbase, COREMO). Several local databases have been developed on the scale of the MPAs in these projects (Meso-America, SMMA, etc.). Projects that aim to develop

POINTS TO CONSIDER FOR THE FUTURE

- Methods for reporting scientific knowledge back to managers and local stakeholders and encouraging their use;
- Developing and testing monitoring methodologies that are useful to MPA managers (ways of building up monitoring systems that are useful to management bodies);
- Comparing the cost-efficiency ratios of different monitoring systems.

Economic value and rate of return

Economic value

An economic assessment mainly sets out to highlight and estimate the value, in quantitative terms, of ecosystem goods and services, rather than to set an exact and absolute economic value on MPAs. Their contribution to decision-makers' awareness of the need to manage natural habitat sustainably is abundantly clear. Although there are many economic studies on coral ecosystems, they only give a partial picture. According to a recent meta-analysis (Brander et al, 2006⁽¹⁾) focusing exclusively on the recreational value of coral reefs, 160 studies have already been made and about 10 new papers are published every year.

To environmental economists, the economic value of the natural environment, or its total economic value (TEV), may be broken down as follows (in Miraud et al, 2007 ⁽²⁾):

- its use value, which covers all direct and indirect uses of a given environment. This includes marketable goods and services (fishing, tourism etc..) and non-market services (coastal protection, carbon sequestration, purification, etc.),
- its option value, which represents the price to be paid to preserve the possibility of using the environment in the future in as yet undetermined ways,
- its existence value, which lies in its intrinsic value regardless of any possible uses made of it, its bequest value, which is the use value it has for future generations.

Thanks to the ecological functions characterising them, MPA ecosystems (coral reefs, mangroves, seagrass beds, etc.) provide services from which people can derive direct or indirect benefits that have an economic and social value (Ahmed et al, 2004⁽³⁾).

Fishing activities, along with tourism, are often the main sources of marketable benefits from MPAs. Fishing in coral habitats accounts for 10% to 25% of all fisheries worldwide. The aquarium market is also a major outlet, with some 12 to 15 million fish traded each year.

Tourism contributes a very large share of GDP and employment in many island nations. It has been booming since the second half of the 20th century. If tourism is managed sustainably, the income it generates can help to preserve MPA ecosystems, but it also very often causes degradation. Forward studies on trends in energy

costs also cast doubt on the value of protective models relying exclusively on revenues from international tourism in particular: with anticipated peak oil and higher fossil energy costs, the long-term viability of tourism cannot be taken for granted everywhere.

Coastal protection is also an important source of environmental value. Many islands owe their very existence to the presence of coral reefs, like the 84 atolls in French Polynesia or the scattered Indian Ocean islands. Fringing and barrier reefs and mangroves are of great importance in reducing beach sedimentation and storm damage along coastlines. The economic effects if these reefs are damaged or disappear can be catastrophic. These different values are estimated in economic calculations.

Finally, pharmaceutical drugs in which the active substances are processed from marine organisms, pearl oyster farming and the cultural role of these areas (e.g. sacred or taboo areas in some sites) are also goods and services that can be quantified in economic calculations of MPA value.

MPA ecosystems and the benefits they provide have a value because people can benefit directly or indirectly from their use, or simply because they exist.

Among the projects supported by the FGEF, TEV calculations have been made for two MPAs.

- The World Research Institute has made an assessment for the SMMA in St Lucia, but the economic value calculation does not include the existence value,
- A similar study was made under the CRISP programme by Tanya O'Gara, on the Nava Kavu MPA in Fiji. The programme also financed other studies on the economic values of coral reefs in the Pacific.

(1) Brander L. M., et al, 2006, "The Empirics of Wetland Valuation: A Comprehensive Summary and a Meta-Analysis of the Literature", Environmental and Resource Economics, vol. 33, pp. 223-250.

(2) Mirault, E., 2007. Les fonctions et enjeux socio-économiques des écosystèmes récifaux : une approche géographique des valeurs de l'environnement appliquée à l'île de la Réunion. Thèse de Doctorat, Université Paris X.

(3) Ahmed, M. and Chong, C.K. and Cesar, H. (eds.), 2004. "Economic valuation and policy priorities for sustainable management of coral reefs," Working Papers, The WorldFish Center, number 16117, June.

SMMA: although the assumptions made can always be disputed, the study provides a robust estimation of the different use values of the reef in the SMMA (the figure does not give a true TEV). According to the estimation, tourism accounts for 94% of the total value of 76 million US\$, coastal protection for only 5% and fishing for 1%.

Fiji: this study attempts to assess the value of traditional fishing zones (known as iqliqolis) and their resources for possible compensation purposes, on the basis of use value (fishing and tourism) and the value of non-use. For the 11 iqliqolis studied, the direct value in terms of fishing is assessed at 1.3 to 3.4 million €/km²/year and 32 500 to 236 000 € depending on scenarios.

Rate of return (EIRR)

An assessment of the cost-effectiveness of investing in an MPA can also be made by attempting to determine its Economic Internal Rate of Return (EIRR). This is a highly codified and purely quantitative approach that demands a great deal of data.

Economic analyses based on the EIRR are used to project opportunities generated by the MPA into the future and to compare these prospects with the costs (government funding, external donations, etc.) incurred locally from the outset of the project.

Decision-makers can thus attempt to assess the economic effectiveness of funding agency intervention in terms of contributions to local development and conservation. These exercises are based on the rational logic of optimal use of public funds with high opportunity costs, but they are also extremely risky given the lack of references and stable methodologies in a field which is new to economists.

This review has attempted, for experimental purposes only, to establish a methodology and calculate the EIRR for three MPAs: Mnazi Bay (Tanzania), Bamboung (Senegal) and Quirimbas (Mozambique). In each case, the methodological choices are justified and explanations given on assumptions, sources of information and gaps.

TEV calculations have the advantage of setting a value on public environmental goods, but the figures obtained are not always intelligible to non-specialists.

EIRR calculations are more readily understandable and make it easier to compare projects.

Broadly speaking, the discounting techniques (including EIRR determination) making up a financial mathematics toolkit to provide decision support are of two main types:

- a rational comparison of several alternative projects, leading to the choice of one, or several, with a high cost-effectiveness ratio and, in particular, returns on investments that are higher than market rates of interest in the sector concerned,
- a posteriori verification of the validity and rationality of the investments made, preferably showing (except when there are non-economic considerations) uses of the funds invested that produce annual interest higher than market rates in the sector concerned.

The notion of discounting cannot be dissociated from the existence of one – or several – past or future investments which will always imply that some kind of change has occurred in

a previously balanced situation or individual or collective routine.

The conceptual gymnastics involved in these discounting calculations do not mask the fact that this is a pioneering exercise in several respects, which involves a great many assumptions, estimations and even approximations. The main value of the exercise and the many assumptions and estimations put forward has therefore been to demonstrate that unfortunately, in 3 case studies, the statistical apparatus used in the monitoring operations implemented in the MPAs is highly inadequate in areas that are essential to discounting calculations. The initial status of resources and prices (before the MPA was created), the actual rate of recovery of fish stocks and even, which is highly regrettable, changing development activities in agriculture, fish farming and forest management are usually reported inadequately, if at all.

In any case, given that the calculations logically have to be made over the long term (15 years seems reasonable to reflect whether or not the will to establish an MPA on a permanent basis has endured⁽¹⁾), assumptions have to be made and scenarios developed to include decisions not yet made and changes that can only be outlined as a possibility. This is the case, for example, with the possible decision to establish the "Mtwara Corridor" in Tanzania, linking Mozambique with Dar es Salaam via Mnazi Bay, and which is not yet in the hands of either sectoral, national or local authorities in charge of creating and managing the Mnazi Bay MPA.

The formal and sophisticated presentation of the approach and its results should not lead readers astray: the point is not to make an issue of every figure that might follow a decimal point, but to use the results as a source of information and input to discussions on the effectiveness of the public money used to support the projects.

Lessons learned

Economic calculations of the value of marine and coastal ecosystems and of the cost-effectiveness of projects supporting them are increasingly common. However, the different values per unit area found not only by different studies but also within a single study, show that there is still some way to go to harmonise methodologies and reach agreement between authors.

Without baseline studies and systematic monitoring, these calculations become very risky indeed when attempts have to be made to reconstitute data on the initial status of a site that should have been supplied by benchmark

(1) See "Projects need time to develop" p.40 and appendix 4

EIRR results

The table below shows that the relative share of activity sectors in an EIRR is very variable, with highly contrasting patterns of predominance: biodiversity in Mnazi Bay, fishing in Bamboung and alternative livelihoods in the Quirimbas.

	Mnazi Bay	Bamboung	Quirimbas
EIRR	3.2%	25%	52.4%
Recovery of fish stocks	15%	80%	18%
Recovery of biodiversity	44%	9%	15%
Tourism	21%	7%	13%
Technical capacity building	3%	2%	8%
Agricultural development		1%	
Alternative livelihoods	14%		45%
Shellfish	3%	1%	<1%

studies. Moreover, without reliable monitoring data, many assumptions have to be made on the critical contributions of MPAs, particularly in terms of stock recovery. It is therefore vital in projects to provide for initial baseline studies and to ensure that monitoring in the field begins as early as possible. These should in fact be essential requirements for AFD and FGEF funding, at least for sites large enough to justify intellectual investments of this kind.

However, it must be repeated that the conclusions drawn from these exercises are only valid in relation to the many assumptions made to support the calculations. In other words, except for general trends and large masses, it would be unrealistic and even dangerous to treat the results as having a scientific value which they do not possess.

Nevertheless, bearing these theoretical precautions in mind, there are considerable advantages, especially for inter-MPA comparisons, in taking the time to understand and analyse income-generating activities in MPAs and to find the means to quantify them, in order to better protect the interests of important sites for conservation and development. The main value of this kind of work therefore lies not in its results but in the issues it raises that can help MPA promoters and managers to ask the right questions to ensure that MPAs function as effectively as possible.

Therefore, even if calculations of economic values cannot directly support management or even justify the relevance of protecting a site, they can help to define potentially income-

generating sectors (e.g. fee and tax calculations in the SMMA). They can also support communication with stakeholders and users in the zone as well as negotiations with funding agencies and parties to commercial agreements capable of generating funds. The Banc d'Arguin national park (not included in the assessments used here) offers an interesting example. On the basis of a very rough estimation of the Park's services in promoting reproduction in fish populations (value estimated at 150 million €), the Park was able to persuade the Mauritanian government and the European Commission to contribute 1 million € per year under the fisheries agreements between the European Union and Mauritania.

POINTS TO CONSIDER FOR THE FUTURE

- Continue to implement total economic value (TEV) assessment of MPA to improve non-use value assessment methods;
- Develop and test cost/benefit analysis as investment decision tool for MPA;
- Try and test the economic analysis to tackle compensations, long term financing and governance questions within MPA;



An MPA in the Solomon Islands (© T. Clément)

Recommendations

- An MPA can only become self-sufficient after 10 to 15 years. FGEF support to projects should therefore be deployable in the form of a programme which is broken down into the three project phases identified over the length of time required for an MPA to achieve self-sufficiency. The FGEF should therefore redirect its funding to a smaller number of projects while maintaining its financial support to the same site for a longer time. Financing for small projects could be additional to these arrangements.
- Plan for reasonable deadlines to complete activities (establishing management units, calls for tenders) without undue haste.
- Produce more detailed feasibility studies within increased deadlines and budgets. These studies should include more indepth social science and ensure that all stakeholders are involved in designing the project.
- Confirm the political will to make protection an official goal, the support of local populations to the



establishment of a protected area and the involvement of a project developer, all of which are necessary conditions for a project to succeed.

- Move rapidly to practical and visible activities that either benefit populations or foster their adoption of the project.
- Consider fishing as a priority and make every effort to resolve problems for fishermen caused by the MPA and to ensure that the relevant activities are monitored.

- Make sure that the alternative fishing methods proposed are appropriate, or provide for their adaptation, only proposing new methods on the basis of sound prior studies (conditions of acceptance by populations, impacts on the environment and resources). Develop the necessary scientific studies to support sound fisheries management.

- Zoning is fundamental: scientific studies must be developed to establish effective zoning, both in terms of biodiversity protection and manage-

ment of commercial resources, and to ensure that the zoning plan will have a tangible impact on the MPA as a whole.

- Conduct in-depth analyses of the technical and socio-economic feasibility of alternative livelihoods and hand responsibility for their development to professionals. These activities should be of benefit first and foremost to people who are penalised by the MPA project.
- Establish a monitoring system from the earliest stages of the project and produce a reference study in the first year on the chosen indicators (biological and socio-economic).
- Adopt monitoring systems that are suited to MPA objectives and available means. If an economic evaluation of the MPA is possible, ensure that the data required to apply the chosen methodology are effectively gathered.
- Establish a requirement to produce, at the end of the project, a lessons learned document covering the main results obtained, lessons learned and output that can be transferred to other MPAs (brochures, price structures, methods, etc.)
- Develop the financial business plan as soon as possible, setting out long-term financing solutions for all MPA activities.
- Adapt budgetary rules to actual conditions in the field and develop long-term financing solutions for MPAs that cannot cover all of their operating costs themselves.
- Strengthen project monitoring by the FGEF.
- Maintain the reactivity and flexibility of FGEF project management, which has often been crucial to project success

APPENDIX 1

Successes to be highlighted and pointers for progress

Successes	Pointers for progress
Meso-America Project	
The FGEF project, the first to implement the MAR strategy following the eco-regional analysis, played an important part in forging links with other sectoral programmes and is one of the few projects that have enabled work on policy aspects.	Overambitious programming.
Important gap analysis work on existing protected areas on land and at sea, concerning commercial species.	Human resources too limited at the start of the project.
MARFUND and the MarFin tool for MPA network financing are unique in the world.	Preparatory studies for the development of alternative livelihoods were inadequate, the ALs were introduced on too small a scale and have had no impact on living standards or on fishing pressure.
Important innovations in this project are the harmonisation at regional scale, and annual use, of a new tool to measure MPA management effectiveness, and also of ecosystemic fisheries monitoring.	Biological monitoring was introduced too late and will not be able to produce any measurement of project impacts by the time the project ends.
Although there is still a long way to go towards eco-certification of the lobster fishery, the WWF's activities have made important strides in raising awareness among industrialists and fostering good practice in this area.	The project's regional dimensions and the fact that those responsible for its implementation were scattered across several countries probably added to the burden of implementation.
The project enabled participation, to a modest extent, in the important work under way among agro-industrialists to reduce pesticide pollution from agricultural catchment areas and to develop good practice.	
The specific feature of this project is that it is very much partnership-based, and although this somewhat reduces FGEF visibility, it has strongly boosted dynamics between players in the region.	
Strategic partnerships with industrialists and policy-makers in the agricultural field as well as the lobster fishery are among the main advances made by the project.	
Cocos Island Project (Costa Rica)	
Costa Rica's most advanced marine park	Substantial delays and some activities not implemented at all (e.g. monitoring, eradication of invasive fauna, trust fund).
Strengthened surveillance means and capacities.	Dialogue with fishermen proved difficult.
Substantial progress in scientific knowledge of the zone.	Strong pressure exerted by illegal fishing despite surveillance efforts.
Study of tourist carrying capacity.	
Programme for volunteers.	
Numerous awareness-raising activities.	
Guide to good diving practice.	
Development of legal tools under way.	
OPAAL Project (Caribbean)	
A highly strategic project in terms of biodiversity conservation.	Over-optimistic schedule and under-estimation of the time needed to complete operations.
The regional approach secured know-how that was not necessarily available in each member state, and generated economies of scale in methodology development, although reaction times and schedules have lengthened.	Very few practical activities in the field, which has antagonised populations and undermined project teams: "too much study and not enough action".
The strategy requiring the prior publication of legal texts creating MPAs before funds are allocated has paid off but considerably delayed the project schedule.	The World Bank procedures applied for boat purchases are totally unsuited to the island context, where not one of the local businesses is large enough to respond. Because of this, it took 3 years to purchase the boats.
Establishment in Tobago Cays of a politically and financially independent MPA management body.	No alternative livelihoods were properly identified or implemented despite costly preparatory studies on the subject.
Establishment in Tobago Cays of a system of tourist taxation to cover operating expenses of the management body and patrol teams.	Rather cumbersome regional system.
Benchmark standards established in all sites.	Monitoring not yet established, even in the most advanced MPA.
SMMA Project (St Lucia)	
The development of a conflict management process which is very well suited to the local context and closely in touch with local concerns has clearly produced positive results.	Major threats to the site from solid and liquid pollution and from erosion and sedimentation from the catchment basin. The non-inclusion of land areas in the MPA project is now clearly showing the limitations of the approach.
Wide-ranging communication on managing natural resources and on the project, targeting the general public in the region (newspapers, radio, schools, etc.) and beyond, in magazines and international TV programmes.	Tax matrix in need of updating to help cover the investment costs of refurbishing equipment (obsolete boats and buildings, inefficient radio, etc.).

Establishment of a politically independent MPA management body which has been adapted along the way to meet emerging problems and needs.	Some loss of motivation among team members.
Establishment of a system of tourist taxation to cover all operating expenses of the management unit and patrol teams.	Scientific monitoring of high quality but few measurements are being processed.
Highly effective handling of problems among fishermen (awareness-raising but also significant investments in the sector) that have helped to settle differences in the zone and allowed the various activities to proceed harmoniously.	Addition by the government of another protected area (CMMA) to the north of the SMMA with no provision for its management, which is undermining the credibility of the system as a whole.
Establishment of annual scientific monitoring of MPA effects on coral reef health and on fish populations.	
Demonstration through scientific monitoring results of the considerable effects of the MPA on fish populations within its boundaries and on fishing revenues.	
Creation of a "model" MPA that many others are coming to visit.	
Project costs held within reasonable limits.	

Narou Heuleuk Project (Senegal)

The development of an awareness-raising method (film projections with discussions) that is very well suited to the local context and closely in touch with reality on the ground has undoubtedly lived up to its promise.	Project duration too short for 4 of the 5 planned MPAs to reach a stage where their viability could be assured.
Wide-ranging communication on managing natural resources and on the project, targeting the general public in the region (newspapers, radio, schools, etc.) and beyond, in magazines and international TV programmes.	Need to secure additional financing to complete the efforts begun.
Establishment of annual scientific monitoring of the Bamboung MPAs effects on fish populations.	4 out 5 MPA projects held up pending publication of a presidential decree listing the sites for protection.
Demonstration through the results of scientific monitoring of the considerable effects of the MPA on fish populations within its boundaries.	No request from Océanium for support from professionals on alternative livelihoods (e.g. tourism professionals for the eco-lodge), which may be a problem for the amenity's future.
Identification and partial implementation of highly innovative alternative livelihoods (community-run eco-lodge at Bamboung, fresh oyster marketing in Casamance, etc.) to cover MPA costs.	
Numerous exchanges between sites have considerably speeded up the adoption of the project by local stakeholders.	
Moves to take advantage of strongly motivated groups in the MPAs to build up other environmental protection projects, such as mangrove replanting by volunteers in Casamance, which has been a remarkable success with 5 million trees planted in 2008.	
Project costs held down to a very tight budget, thus demonstrating that is possible to create MPAs at very reasonable cost.	
High economic internal rate of return (26 %).	
Other funding agencies besides the FGEF are taking an interest in Océanium's work.	

Mnazi Bay Project (Tanzania)

Moderate but increasing participation from civil society in studies and monitoring (about 20 people recruited to date).	Highly complex institutional set-up, numerous administrative and financial problems between funding agencies, project management lacks a partnership basis, difficulties between the project leader and the IUCN technical assistant, major disruption in project implementation between the two phases, reporting inconsistencies.
Moderate but increasing awareness among village communities.	
Promising alternative livelihoods, with a number of successes triggering dynamics among groups that have spontaneously developed new activities.	Park boundaries still not marked out despite several discussions with specialists on the necessary human resources and equipment.
Production of Village Environment Management Plan that are included in the management plan.	Alternative livelihoods: inadequate feasibility studies, too restricted in scale, several failures.
Highly satisfactory scientific studies in terms of quality and quantity (large document collection, information base and decision-support tools of considerable interest). Socio-economic and fisheries studies are producing important management material.	Difficulties with the fishing gear exchange programme, probably due to inadequate analysis and accompaniment.
The highly participatory MOMS system implemented seems promising and deserves to be monitored over the long term.	Park viability uncertain: costs (200 000€ per year) are a long way from being covered by entrance fees (3000€ per year on average) and prospects for tourist development are very distant.

Quirimbas Project (Mozambique)

The strategy adopted encourages strong community involvement.	Management structure has no legal form (park administration costs not included in government accounts).
A legal basis for co-management has been established.	The WWF's support to the park could slow capacity-building.
Local government well integrated in the project.	Possible confusion between the respective roles of the WWF and park management.

Creation of fisheries committees.	Too many scattered small-scale activities that are unrelated to conservation.
Marine reserves are already demonstrating their effects.	Inconsistencies between the project and the management plan.
Illegal fishing is declining.	Management plan developed without sufficient knowledge, hence inappropriate zoning.
Reserves patrolled by members of the communities.	Monitoring know-how is external to the Park (conducted by WWF).
Fishermen trained in monitoring.	Monitoring data not pooled sufficiently between the WWF and Park management.
Patrols effectively coordinated with Navy operations and fairly dissuasive.	The tourist development mission places too great a load on Park management.
Tourism is generating finance for the Park .	
A basis has been established for sustainable tourism.	
Development of community tourism.	
Importance given to training.	
Existence of a business plan.	
Importance given to monitoring.	

IOC Project

Networking between managers established.	Major delays in the project.
Support to the regional coral reefs monitoring network (GCRMN).	MPA activities financed on demand from the management body, regardless of overall consistency.
Ecoregional analysis process under way.	Delay in the international process of listing Mohéli as a Biosphere Reserve.
Several activities financed in the region's MPAs.	Mismatch between the scale of the project and size of the management unit
Communication activities.	
Web site for the project and MPA management network.	

REI Project (Seychelles)

Methods developed for rodent eradication (rats) reproduced in islands of the same type, successfully used on two granite islands.	Delays in the programme.
Methods developed for cultivating and reintroducing local plant species, successfully used on two granite islands.	Lack of involvement from some local players.
Methods developed for reintroducing different local fauna species, successfully used on two granite islands.	Breakdown of some relations with the private sector.
Know-how transfers to local people including high-level training for local executive staff.	Long-term sustainability of operations is highly dependent on the commitment of partners managing the islands.
Experience of considerable interest on conservation work with the private hotel sector	
Possibilities for extending the project to regional scale.	

CRISP Project (South Pacific)

Excellent progress at regional level in coral reef management in the broadest sense (MPAs, research, exchanges, etc.).	Too few practical activities in the field compared to research and cross-cutting activities.
Significant cooperation between players who are not necessarily used to working together (French-speaking CTOM with neighbouring English-speaking countries, French research centres with other regional centres, between NGOs, between NGOs and the private sector, etc.).	Research and cross-cutting activities need to focus more strongly on support to field activities, especially MPA and catchment basin management.
Wide-ranging communication for the general public (web site, press, symposia, etc.) on managing natural resources and on the programme.	Collaboration between components is not strong enough to develop well integrated "model" projects.
Contributions from numerous financial partners besides the FGEF and AFD have increased the initial programme budget from 8.4 M to 14.5 M (2008) in just two years.	Not enough means given to the regional coordination unit to pilot and monitor the project (financial aspects included) up to the measurement of results.
	Few studies made to support measurements of the long-term socio-economic effects of practical programmes, including MPAs.
	The future of long-term activities after CRISP must be addressed very soon, especially for MPA projects.

APPENDIX 2

Tangible results and output to be shared with other projects

Fisheries

Meso-America:

- Simplified version of the FAO code
- Ecosystem method for fisheries studies
- Lobster pot design for sustainable fishing
- Example of agreements with catering chains
- Artificial reefs and FADs
- Fisheries management plans

St Lucia:

- FAD models and the accompaniment process for fishermen
- Model for financing patrols

Tobago Cays (OPAAL):

- Model for financing patrols

Senegal:

- Film projection and discussion model for raising awareness in fishing communities
- Community patrol model and financing

Mnazi Bay

- Socio-economic studies of the fishing sector and proposals for fisheries monitoring

Quirimbas

- Fisheries committees
- Sanctuaries
- Fisheries monitoring and the corresponding database
- Guide to creating and training fisheries committees

CRISP:

- Model for community MPA patrols in the Solomon Islands, Vanuatu and Samoa
- Integration of traditional fisheries management methods (Tabu, Rahui) to create MPAs with a modern legal basis
- Principle of community monitoring of MPA effects

Tourism

Meso-America:

- Good practice guides on moorings, scuba diving and snorkelling (not financed by FGEF)
- Example of scientific tourism on Cayos Cochinos

Cocos island:

- Brochures and videos for tourists
- Studies of carrying capacity
- Tourism planning study
- Good practice guide on diving
- Volunteer programme

SMMA:

- Brochures for tourists
- Activity price structure

Tobago Cays (OPAAL):

- Activity price structure

Bamboung (Senegal):

- Brochures for tourists

Mnazi Bay

- Directives for tourist operators (to be issued)

Quirimbas

- Tourism development plan

- Inclusion of tourist operators' rights and obligations towards communities from the project set-up stage and in the management plan
- Community development through hotels, particularly the Guludo Lodge example

CRISP:

- Study on certification for tourism
- Moorea MPA business plan (under way)

Thailand:

- Examples of eco-certification (Green Fins and Green Leaf labels) and many other results will be transferable, but the project is still too recent.

AL

Narou Heuleuk:

- Village tourist camp in Bamboung
- Manatee observation tower in Casamance
- Agreements between hotels and fishermen on the Petite Côte
- Fresh oyster marketing in Bamboung and Casamance

St Lucia - SMMA:

- Micro-credit scheme for fishing communities
- FADs

Mnazi bay:

- Report analysing successes and failures of alternative livelihoods: world-wide and regional summary based on examples in the Comoros, Mauritius, Mozambique and Tanzania
- Techniques for fattening mangrove crabs

Quirimbas:

- Techniques for rotating oyster harvests
- Community development fund

Indian Ocean:

- Methods and training kits for whale-watching
- Rodrigues: glass-bottomed boat

CRISP:

- Techniques for capturing and breeding post-larval fish and crustaceans

Other

Meso-America:

- The Marfin tool, which is unique in the world, for financial management of MPAs and MPA networks
- Gap analysis of protection for commercial species

Cocos island:

- Development of methods for restoring degraded forest zones

Mnazi Bay:

- Village planning and management documents

Indian Ocean:

- Network of management bodies
- Methods for planning MPA networks

Seychelles (experiences to be exchanged with Cocos Island):

- Methods developed to eradicate rats, reproducible in islands of a similar type
- Methods developed to cultivate and reintroduce local plant species
- Methods developed to reintroduce different local animal species

APPENDIX 3

Extent of marine protected areas (in km²) created or under way, and supported by FGEF projects

			Created	Under way	Supported
Meso-America	Guatemala	Punta de Manabique			1026
	Honduras	Cuero y Salado			50
		Cayos Cochinos			483
		3 to be created ??		??	
Costa Rica	Costa Rica	Cocos Island			1947
OECS	Dominique	Cabrits national park			4.26
	St Vincent/ Grenadines	Tobago Cays marine park	60		
	Antigua & Barbuda	North East Marine Management Area		70	
Caribbean	St Lucia	Pointe Sables National Park		2,3	
	St Lucia	Soufrière marine management area	1.2		
Africa	Senegal	Bamboung community MPA	20		
		Cap Manuel community MPA		2.9	
		Casamance community MPAs		40	
		Nyanning community MPA		42	
	Tanzania	Mnazi Bay			250
Mozambique	Quirimbas			1522	
Indian Ocean	Seychelles	Aldabra			180
		Cousin Island			0.27
		Aride			0.7
		Sainte Anne			14.23
	Rodrigues	Rivière Banane			1.5
	Mauritius	Balacava			5
	Madagascar	Nosy Tanikely			0.1
		Velondriake			28
		Nosy Hara			1831
	Comoros	Mohéli			404
Thailand	Thailand	Similan			124
		Surin			103
		Lantah			109
CRISP	Vanuatu	Mistery Island	5		
	Vanuatu	Group of 6 MPAs at Nord Efate	11.2		
	Solomon	Group of 5 MPAs at Marau	50		
	Solomon	Group of 6 MPAs at Sand Fly	3.1		
	Solomon	Group of 3 MPAs at Langa	1.65		
	Samoa	Aleipata MPA			63
	Samoa	Safata MPA			53
	Tuvalu	Nukufetau	??		
	Tuvalu	Nanumea	??		
	Kiribati	Tarawa	??		
	New Caledonia	Mont Panié Yambe Diahoué Zone			65
		Mont Panié Lindéralique/Coulnoué Zone			?
	New Caledonia	Yves Merlet Reserve			167
	French Polynesia	Moorea MPA			49
	Cook Islands	Group of 4 MPAs at Ra'ui	0.82		
Cook Islands	Aitutaki - new MPAs	??			
Wallis & Futuna	PGEM d'Alofi, W&F 3 AMP			243	
Total excl. Kiribati			147.97	465.2	8415.06
	Kiribati	Phoenix islands PA	410 500		
Total			410 647.97	465.2	8415.06

APPENDIX 4

The "Compass Card" method for MPA assessments

MPAs generally develop in three phases.

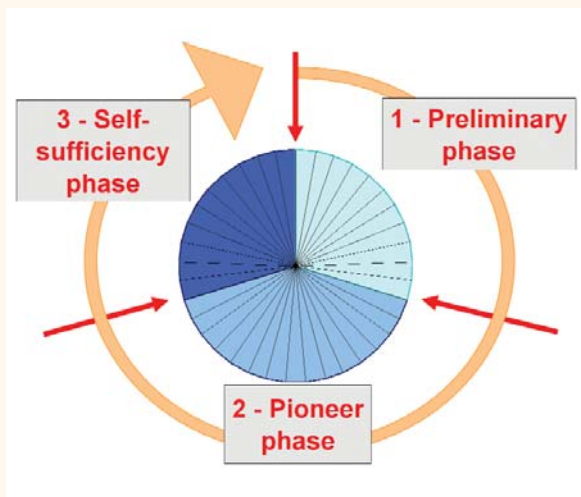
This assessment suggests that the process of establishing an MPA can be roughly divided into three phases, up to the point when it is well on the way to financial, technical and institutional self-sufficiency.

Each of these phases can be divided in turn into stages that can serve as criteria to assess the project's state of progress and robustness.

- **Phase 1**, the "preliminary" or creation phase, usually ends with the official creation of the MPA and covers all stages prior to project implementation (see criteria below). At this stage, the project developer needs to have imagination, a good feel for the terrain and to be adept at listening and communicating with all stakeholders to help identify areas needing protection, management rules that stakeholders will agree to and any alternative livelihoods.

- **Phase 2**, the "pioneer" phase, is when management becomes operational and the system is consolidated. It could be described as an "adolescent" or apprenticeship phase for an MPA as it builds up professionalism. Inventiveness and reactivity are also needed at this stage to build on achievements and to fine-tune the project's institutional and economic backbone as it matures. But this phase also demands a professional approach, which may require know-how and support from external teams, for example in a project to develop an alternative livelihood that requires very specific knowledge (marketing fresh seafood for example) alongside the conservation project.

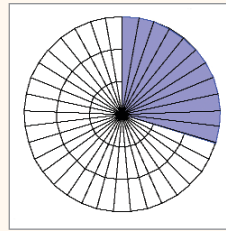
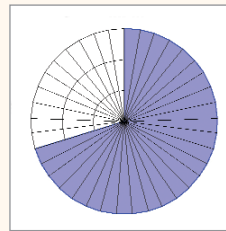
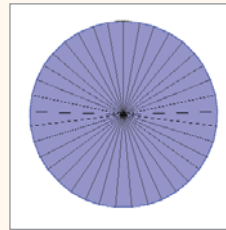
- **Phase 3**, the "self-sufficiency" phase, is achieved when the MPA is well on the way to technical, organisational and financial self-sufficiency.



(1) The principle behind this method is close to the WWF's RAPPAM method or the World Bank's scorecard method, but it has been deliberately simplified for easier use. If necessary, the criteria can be adapted to the type of MPA concerned.

Each phase involves a whole range of adaptable stages/criteria:

Each phase takes place in a series of stages that can serve as assessment criteria. These stages, or criteria, are set out clockwise around the rim of the "compass card".

Phase 1 fully completed:**Phases 1 and 2 fully completed:****Phases 1 to 3 fully completed:**

The box below shows a series of stages, used as criteria, that describe the content of each phase⁽¹⁾. However, the way activities are organised as the different phases take place may vary from one MPA to the next. In a community MPA project, for example, fostering community acceptance of the project may take priority over detailed scientific studies, which in any case will be less relevant if the community is not interested in developing an MPA to begin with (e.g. Bamboung MPA in Senegal). In a developed country, it is easier to start with scientific studies to establish an MPA (e.g. Yambé – Diaouhé MPA in New Caledonia under CRISP). Another example illustrates the relative nature of the order of these criteria: it is quite common to find an informal management structure already in existence before the official creation of an MPA (Cayos Cochinos, for example). In some cases, therefore, the official creation actually brings the "preliminary" phase to an end, while in other cases (OPAAL project), the official creation of a site is one of the very first activities in MPA development.

These stages/criteria, can therefore vary somewhat from one MPA to the next, although there is relatively little that can be changed in the above list. However, as we have just seen, the chronological order in which these stages take place can be adapted to the different circumstances and should not be seen as an obligatory schedule for effective MPA development.

The different MPA phases (brief checklist for managers) and indicative stages within each phase

Preliminary or creation phase

- Identification of zones of ecological interest
- Identification of stakeholders affected by the MPA
- Stakeholder participation process
- Natural resources baseline report on (point 0)
- Socio-economic baseline report (point 0)
- Identification of the protected area perimeter
- Identification of zoning (if applicable)
- Identification of management rules per zone
- Identification of alternative livelihoods projects (optional)
- Ownership of the project by beneficiaries
- Identification of benefit-sharing rules
- Ownership of the project by the authorities
- Creation of the management body
- Creation of the management committee
- Official declaration of MPA creation

Pioneer management phase

- Communication on the MPA's creation
- Delimitation of MPA boundaries
- Start of management operations and surveillance
- Preparation of a business plan
- Finalisation and approval of the management plan
- Start of alternative Livelihoods project (if applicable)
- Routine management committee work
- Capacity building within the MPA
- Continuation of information and awareness-raising programme
- Monitoring begins (biological, socio-eco and management efficiency) and feedback to populations
- Monitoring of management activities begins (compass card)
- Accounting system established

Self-sufficient management phase

- Effective implementation of the management plan
- Community involvement efforts continue
- Checks on equitable benefit-sharing
- Alternative livelihoods project (if applicable) established on a professional basis
- Capacity building effort maintained within the MPA
- Monitoring continues – project log (compass card)
- Demonstration of beneficial ecological effects
- Demonstration of beneficial socio-economic effects
- Review of the management plan and adaptive management
- Long-term financing secured and reserves created for investments

The chronological order in which these stages/criteria take place is immaterial: the important point is to fulfil all of the stages/criteria in the course of each of the three phases in MPA development.

Once the criteria for the MPA in question have been defined, as well as their indicative order, this list becomes the project's critical path, which managers can update as and when the project makes progress. It can be represented in the form of a compass card diagram (see Graph A3.1. below for the MPA in the Soufriere Marine Management Area in St Lucia).

The three phases in MPA development are represented as moving ahead in a clockwise direction, from right to left, around the rim of the "compass card".

Each stage/criterion is described in a segment of the "compass card". Each segment has graduations that keep a score of the extent to which each stage is completed and successful (0: not carried out, 1 started, 2: well on the way, and 3: fully completed).

The criteria follow each other in logical succession in a clockwise direction, from preliminary activities prior to the MPA's creation (phase 1) up to self-sufficiency (phase 3). These stages/criteria are scored from 0 to 3, moving from right to left, which represents not only the relative "career" of the MPA as it moves through its three phases ("in which phase have stages been completed, or criteria satisfied?"), but also the quality of the development process ("is the circle's circumference smooth or does it dip in places to show where stages have not been completed – or criteria satisfied?").

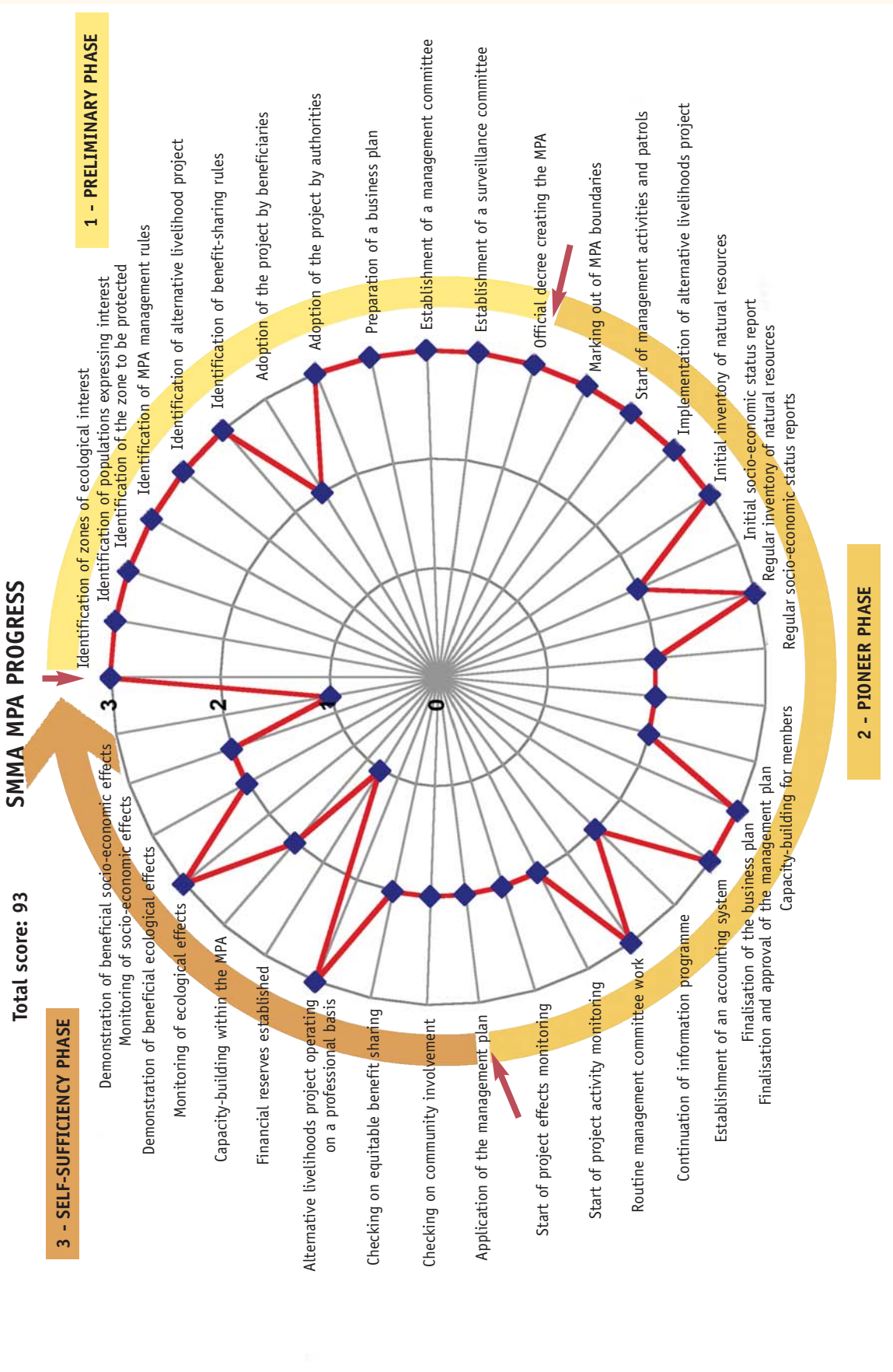
The more stages/criteria are covered around the compass card, the more robust the MPA's development will be, reflected as such by a broad, continuous circle whose circumference depends on the age of the MPA. When weak points appear, they are represented by dips in the compass card's circumference. A saw-toothed compass card points out stages that have not been completed (or criteria satisfied), so that problem areas in the MPA can quickly be identified.

This tool can also be used to track the course of MPA development over time. Managers can use the compass card to help with day-to-day organisation of their MPA, by filling in the progress made year after year. Graph A3.2. below illustrates the development of an MPA.

Finally, managers of an MPA network can use the compass cards for each MPA site to compare their different stages of development (Appendix 5 shows the compass cards for all the MPAs visited for this review). Chapter "Creation, management and governance of MPAs" in Part 2 of this document shows detailed compass cards for each MPA.

Graph A3.1

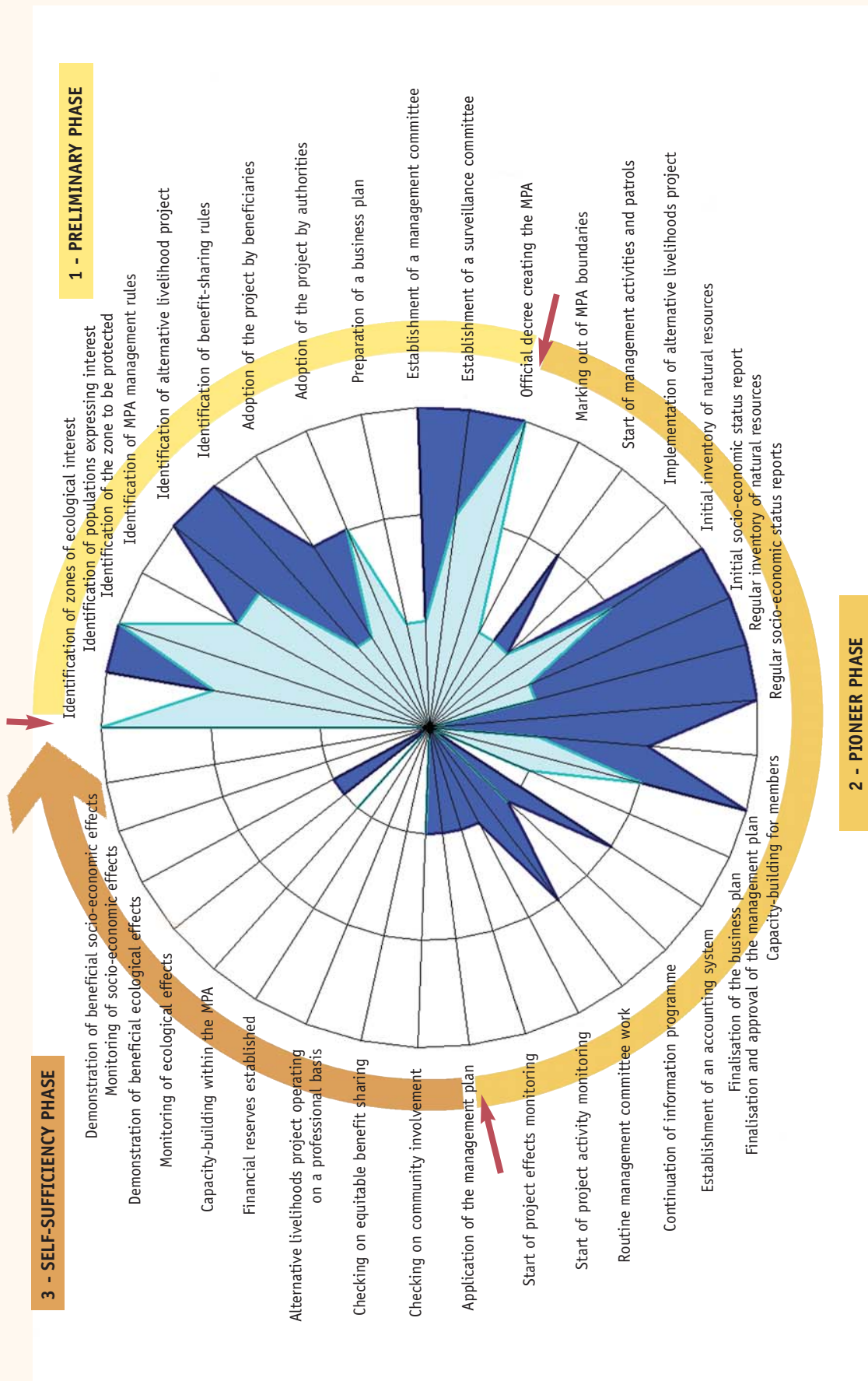
Compass card for the MPA in the Soufrière Marine Management Area – SMMA - (on the day of the assessment)



Graph A3.2

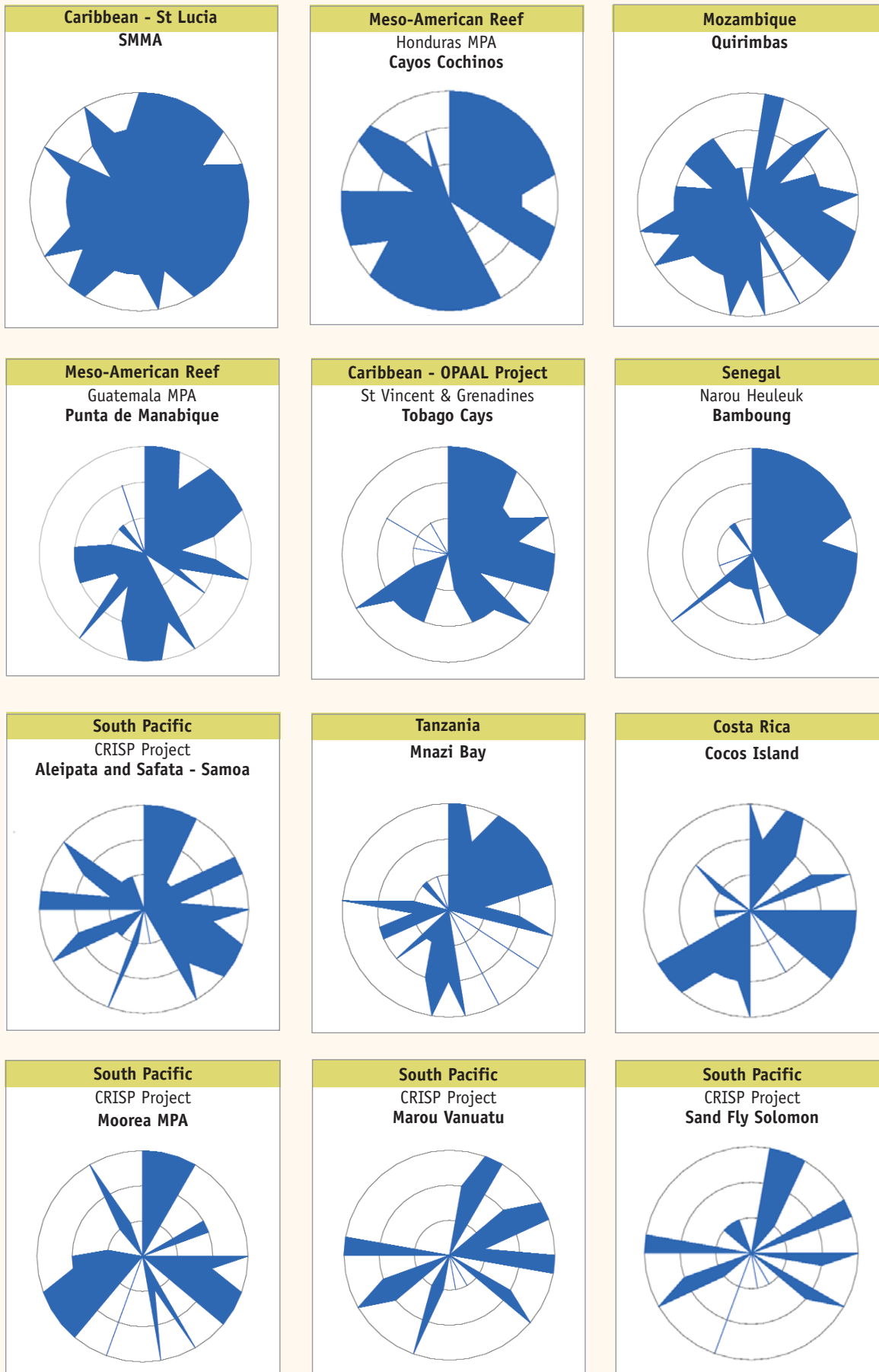
Tracking MPA development over time:

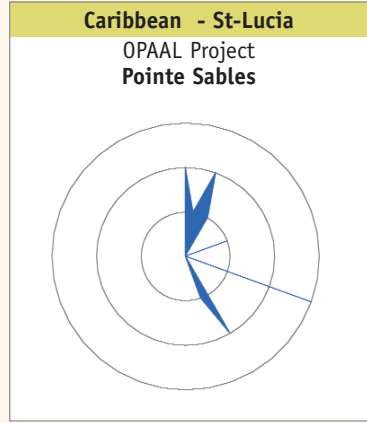
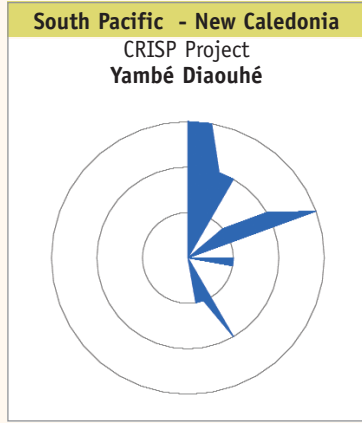
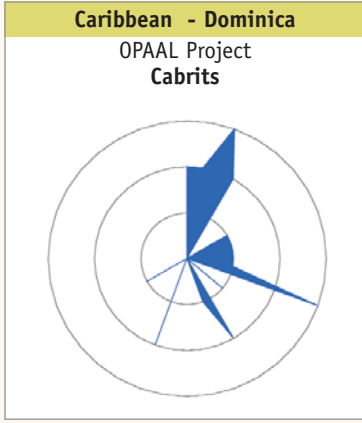
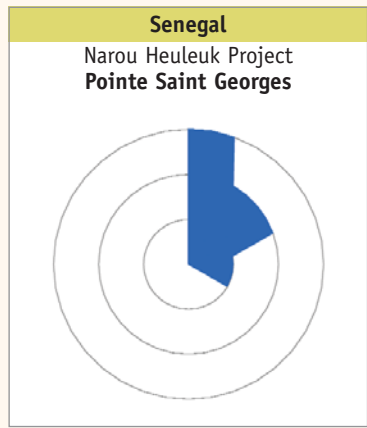
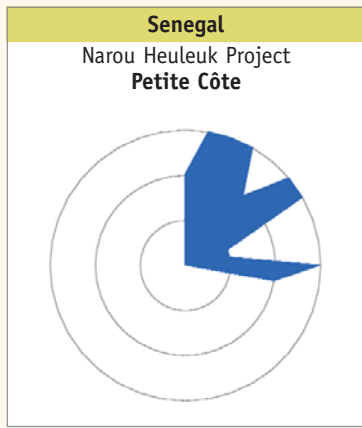
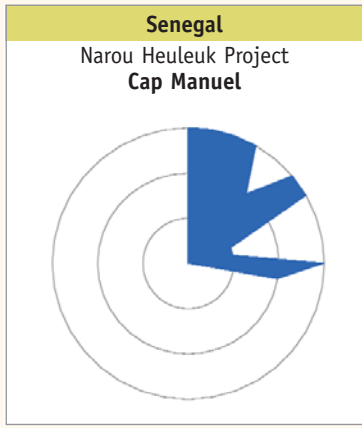
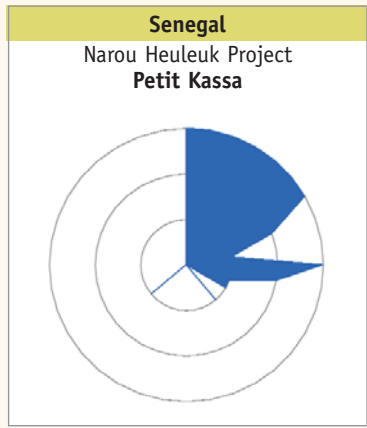
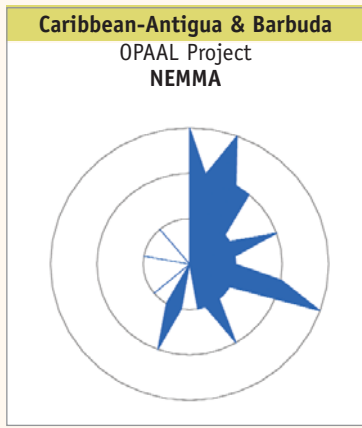
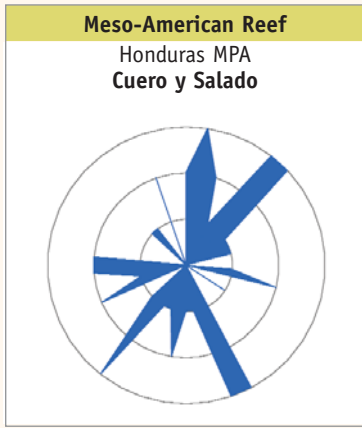
Assessment made in the first year of FGEF intervention
 Assessment made two years later

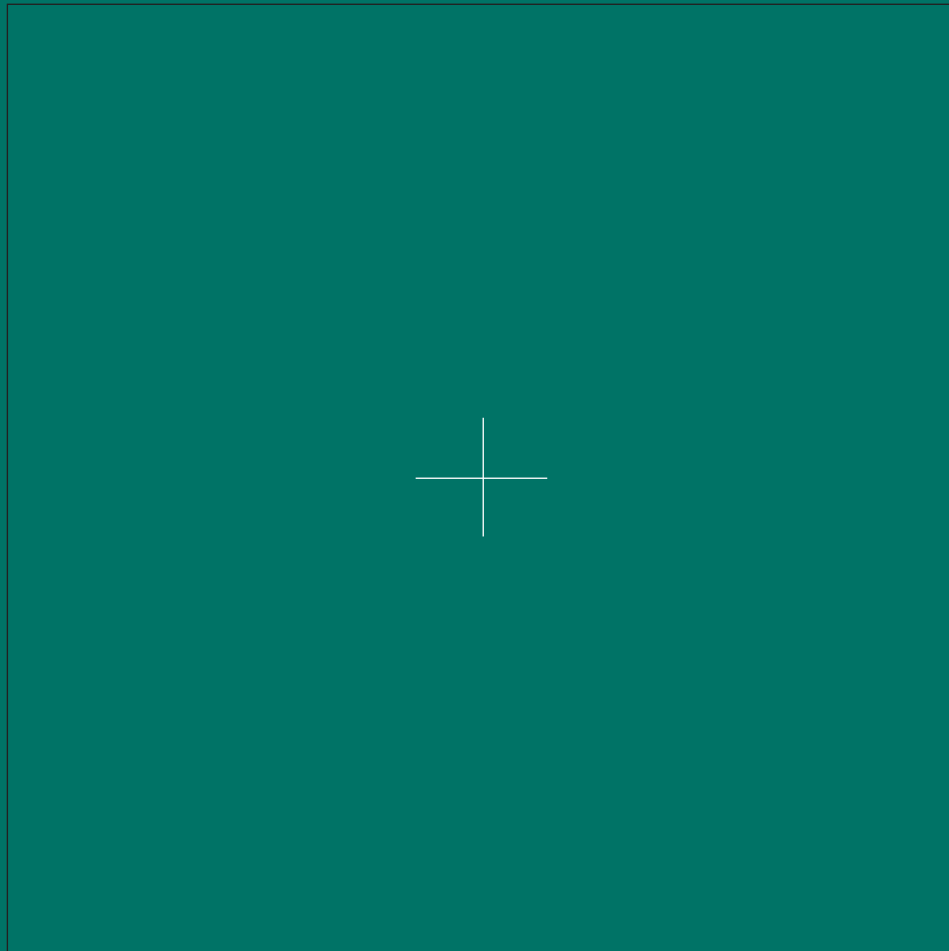


APPENDIX 5

Compass cards and state of progress of project MPAs







In the French/English attached CD:

- **Executive Summary**
- **8 thematic analysis reports**
- **Projects and MPA's synoptic files**
- **Compass card template**

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