

Transforming Coral Reef Conservation in the 21st Century

Achieving financially sustainable
networks of marine protected areas



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INTRODUCTION

Achieving financial sustainability in marine protected areas is critical to realizing the short- and long-term benefits of well functioning marine protected areas (MPAs). A financially sustainable MPA or network of MPAs has achieved: (a) a high level of financial stability (e.g. covering the recurring costs of management) to ensure a continuous level of management; and (b) a sustainable economy in and around the MPA or network. In most cases a high level of investment is required to reach these goals.

The objective of this paper is to (i) document where and how a variety of sustainable finance mechanisms have been employed in marine protected areas, including innovative mechanisms being tested, as well as those still in concept, (ii) discuss sustainable financing from a network perspective, and (iii) illustrate the importance of 'managing' a diverse portfolio of financing mechanisms. The report draws on discussions with researchers, practitioners, marine park managers, government representatives and academics with experience in coral reef conservation in different parts of the world. It also takes examples, ideas and discussions from current literature, including case studies, research papers, and innovative ideas currently being tested.

The paper is structured into four parts: (1) economic analysis as a foundation for achieving sustainability; (2) the different ingredients for financial sustainability, including incentive mechanisms, revenue generation, and cost-effective management; (3) options and considerations for networks of MPAs; and (4) a diversified and adaptive approach to sustainably financed MPAs.

This paper does not incorporate examples and lessons from all the mechanisms being implemented in a variety contexts, and therefore should be considered a "work in progress," providing an initial step towards documenting, monitoring and evaluating mechanisms and methodologies for achieving financial sustainability in MPAs and networks of MPAs. An important next step will be to look at individual analytical methodologies and financing mechanisms being used in different contexts – regional, situational, cultural, etc. – and to extract lessons from each of these mechanisms or methodologies based on a wide range of experiences. In many cases these lessons will come over time, as the use of these tools is, for the most part, still in the very early stages. In some instances, the feasibility of using specific financial tools is more intuitive, based on the situational context.

MAJOR USES OF CORAL REEF ECOSYSTEMS

To set the stage for the ensuing discussions, below is a table outlining the major uses of coral reef ecosystems. These uses need not be considered threats; however, they often act as threats to the resource in the following ways:

- . destructive and unsustainable fishing practices, such as poison fishing, blast fishing, muro-ami fishing and overfishing
- . sedimentation
- . pollution and waste
- . mining and dredging activities
- . unsustainable tourism practices

Table 1: Goods and services from coral reef ecosystems

GOODS		ECOLOGICAL SERVICES				OTHER SERVICES	
Renewable resources	Mining of reefs	Physical structure services	Biotic services - within ecosystem	Biotic services - between ecosystems	Biogeo-chemical services	Information services	Social and cultural services
Sea food products	Coral blocks, rubble/sand for building	Shoreline protection	Maintenance of habitats	Biological support through 'mobile links'	Nitrogen fixation	Monitoring and pollution record	Support recreation
Raw materials and medicines	Raw materials for lime and cement production	Build up of land	Maintenance of biodiversity and a genetic library	Export organic production etc. to pelagic food webs	CO ₂ /Ca budget control	Climate control	Aesthetic values and artistic inspiration
Curios and jewelry	Mineral oil and gas	Promoting growth of mangroves and seagrass beds	Regulation of ecosystem processes and functions		Waste assimilation		Sustaining the livelihood of communities
Live fish & coral collected for aquarium/ live fish trade		Generation of coral sand	Biological maintenance of resilience				Support of cultural, religious and spiritual values

Adapted from Moberg and Folke (1999)

It is not usually possible to have concurrent use of all the goods and services in a coral reef ecosystem. As such, the challenge to conservation is allowing the correct mix of multiple and sustainable use scenarios (Cesar, 2000) in and around well-managed MPA(s). Financial and economic mechanisms help to achieve this mix of consumptive and non-consumptive use options while earning critical revenues for management of the area, all contributing to the financial sustainability of MPAs.

SECTION 1: ECONOMIC ANALYSIS

Economic analysis provides a foundation for achieving financial and economic sustainability in and around marine protected areas. It should be built into development frameworks for MPAs and MPA networks. Economic analysis should be used to highlight the values of coral reefs to decision-makers and to clearly identify the benefits and costs of protecting the resource, including who gains and who loses from well-managed MPAs (versus the current situation) and what is the size of their stake. By identifying the range benefits that coral reef ecosystems provide to individuals and local and national economies, economic analysis should demonstrate the value of protection to individual stakeholders and in doing so justify the opportunity costs of establishing MPAs. Recognizing that all users benefit from protected areas should lead to the establishment of mechanisms by which the MPAs achieve financial stability, with less reliance on government and donor funding.

Decision-making

Economic valuation of coral reef resources is an essential tool to aid decision-making. The methodologies used to identify the values associated with coral reefs are critical to the relevance of any valuation, as is understanding how these values can be captured most effectively. The World Bank Research Committee has funded two streams of research involving cost effectiveness modeling and marine system valuation, both focusing on coral reef systems in the tropics. The broad objective of the research was to assist policy makers in managing and protecting coral reefs by deriving improved estimates of coral reef economic benefits. To achieve this, the research aimed to adapt and refine available valuation methodologies to account for key coral reef characteristics (Ruitenbeek et al. 1999). The research demonstrates that it is less useful to attach a single biodiversity value to a particular reef area, but more useful to identify the range of associated values (see table 2). The research recommends that biodiversity valuation be regarded primarily as an educational tool to assist policy-makers and secondarily as a planning tool in formulating specific policies (see Gustavson et al., 2000). The research tested various valuation methodologies took place in Curacao and Jamaica. Results from a valuation in Montego Bay are shown in Table 2, illustrating the use and non-use values derived through different valuation methodologies.

	Benefit		Price*	
	NPV (MM\$)		MM\$/%	MM\$/ha
Tourism/Recreation	315.00		7.33	17.18
Artisanal Fishery	1.31		0.03	0.07
Coastal Protection	65.00		1.51	3.54
Local Non-use	6.00		0.24	0.56
Visitor Non-use	13.60		.54	1.28
Subtotal	400.91		9.65	22.63
Pharmaceutical Bioprospecting (Global)	70.09		0.23	0.53
Total (Global)	471.00		9.88	23.16
Pharmaceutical Bioprospecting (Jamaica)	7.01		0.02	0.05
Total (Jamaica)	407.92		9.67	22.68

*Marginal Benefits shown at typical current reef conditions

Source: Ruitenbeek et al. (1999)

Government & industry investment

At the national level, economic analysis enables MPAs to demonstrate their financial and economic value to national and local economies, government sectors and private companies (see box 2). This is particularly important because planners and decision-makers in private industry and government often perceive MPAs as generating few economic or financial benefits and therefore impeding economic development. Furthermore, the economic costs of degradation of these areas are considered to be low. These false perceptions tend to limit the amount of funds that the public and private sectors are willing to invest in the long-term management of marine areas.

MPA revenues & management

By identifying the full range of economic benefits emanating from MPAs, economic analysis helps MPA managers to capture additional rents through the resource itself. For instance, international visitors to these areas are often willing to pay a higher fee to enjoy their attributes. The optimal fee can be determined using contingent valuation method, and then adjusted depending on the users' behavior (see box 11). Furthermore, individuals and corporations in faraway countries are often willing to invest in the maintenance of these areas for the knowledge of their value and existence. Moreover, good economic (and financial) analysis can help MPA managers determine how to appropriate limited financing for maximum benefit, how to ensure maximum distribution of benefits and how to prioritize where to spend – in collaboration with stakeholders.

Communities & Local Industry

Economic analysis helps to identify and establish partnership and investment opportunities within the local community. It also can identify alternative or additional sources of income and subsistence for local communities, for whom the opportunity costs of MPAs are often the greatest. Often an analysis is most effective when done collaboratively with local communities and industry so that they themselves perceive the benefits of the MPA.

Table 3: Gains and losses of different stakeholder groups in MPA establishment

STAKEHOLDER	GAINS	LOSSES
Fishers or fishing communities	Increased catch from waters surrounding protected areas; alternative (potentially more lucrative) revenue earning opportunities – e.g. as fishing guides	Displaced from traditional fishing ground, may have to travel further; potential conflicts with other users (e.g. tourism industry) ; may have to change fishing practices
Local resident	Increased employment and business opportunities from tourism-related activities – restaurants, hotels, souvenirs, transport business, etc.	Recreational fishing sites may be displaced; Possible cross cultural friction; bad will among local communities if enforcement is heavy handed
Tourist industry	Increased number of tourists and income due to an improved marine environment, and use of MPA as marketing tool; increased competitive advantage over other tourist areas	May not be able to visit all areas, need to pay visitor and mooring fees. May have to pay fees for licenses to use the MPA.
Tourist	Added satisfaction from better dive and snorkel sites, improved beaches and quality of environment; better fishing opportunities for sport fishers	Often asked to pay a user fee; may be restricted from entering some sites
Government	Sustainable management of marine area. Higher environmental profile vis-à-vis environmental protection; diversified income	Financial support for management, enforcement, etc. (if not borne by others)
Global community	Knowledge that the ecosystem is protected and exists regardless of whether they will visit in the future	May be asked for financial contribution to support MPA, e.g. through "Friends" organization

Adapted from Cesar et al. (2000c)

From an economic perspective, the value of the area for different stakeholder groups can be measured by assessing the direct and indirect benefits that these stakeholders receive from the area. However, it is important to measure the value of the *marine protected area* – ie. the value of the protection provided by the MPA or “the savings from the avoided losses in reef value that would result in the absence of park protection, net of any costs of protection” – rather than the value of the entire resource that is being protected (see Pendleton, 1995). A cost benefit analysis compares the net benefits of protection with the costs of management and the opportunity costs of the park (foregone fish catches and marine product yields from restricted areas). Generally, the opportunity costs – or the loss in production – are perceived as a direct economic cost when an area is restricted from resource use, even if in the longer term the benefits will be greater (see Box 1 and apply it to a situation where the bomb fishers are displaced as enforcement is increased as a result of a well-managed MPA in an coral reef area of high tourism potential).

Box 1: The private profits and economic costs of marine degradation

The social costs and private benefits of blast fishing in Indonesia

In Indonesia, an analysis of the private and social costs of blast fishing illustrated the high opportunity costs to the individual user of protecting the resource, even though in the social costs were considerably higher, and in the long-term the private costs of their activities would be high.

Blast fishing provides income and food to a number of coastal fishers who claim they have no alternative revenue earning options, despite that this type of fishing practice endangers their own lives in addition to destroying coral reefs, the very source of their income. Blast fishermen earn net incomes of US\$ 55 to \$1,100 per month, depending on the size of their operation and whether they are boat owners or are crewmembers on a boat. This is considered a high wage in conventional coastal fisheries. In calculating the related costs to society, Pet-Soede et al. (2000) used an economic model to estimate the net loss after 20 years of blast fishing (at which time the reef would be totally destroyed) at US\$ 306,800 per km² coral reef in areas where tourism and coastal protection values are high, and US\$ 33,900 per km² coral reef in areas where there is a low potential value. The main quantifiable costs were estimated based on coastal protection function, foregone benefits of tourism and foregone benefits of non-destructive fisheries. Hence, the estimated economic costs to society of blast fishing were four times greater than the total net private benefits from blast fishing in areas with high potential value of tourism and coastal protection. The estimates for economic losses are relatively conservative due to the difficulties of translating qualitative natural assets into quantitative monetary values. From the individual blast fisher's perspective, there was a clear financial incentive to scale-up operations. Crewmembers and boat owners with the highest net income per month were participating in large-scale blast fishing operations.

Source: Pet-Soede et al. (2000)

Economic analyses are also useful for determining whether the protected area affects demand sufficiently to justify the direct and indirect costs of protection, providing an argument to development and government planners for increasing investment in protection of marine resources (see box 1). Generally, it is easier (and more acceptable) to quantify the approximate direct and indirect values associated with the MPA and to compare those to the costs and opportunity costs of the MPA.

Table 4: Major benefits and costs of MPAs

BENEFITS	COSTS
<p><i>Fishery Enhancement</i> – After some time lag, the results of protection are larger, more valuable and variable fish species within the reserve, with transfer of benefits to fishing areas through adult spillover and larval export. Habitat protection increases production in reserves. Stock protection reduces the likelihood of fishery collapse</p>	<p><i>Opportunity Costs</i> – Loss of potential earnings, e.g.:</p> <ul style="list-style-type: none">▪ Short-term fishery revenues▪ Revenues from activities forbidden in the MPA, such as coral mining, shell extraction and blast fishing▪ Large-scale tourism and resort development▪ Industrial and infrastructure development
<p><i>Tourism & Recreation</i> – Enhanced opportunities for tourism and recreation is a major objective of many protected areas. Enhancement of fish stocks in reserves and associated habitat protection increase appeal for tourism. This creates employment opportunities directly linked to the reserve (e.g. tour guides, wardens) and could stimulate a multiplier effect through the local economy (e.g. hotels, restaurants, infrastructure, taxi services, etc.)</p>	<p><i>Direct Costs</i> – Including costs of:</p> <ul style="list-style-type: none">▪ Establishment▪ Administration▪ Employment▪ Monitoring and enforcement
<p><i>Biodiversity Conservation</i> - Reserve protection leads to the recovery of exploited species in reserves, increased species diversity and improvements in habitat. These changes are expected to lead to greater resilience of populations to environmental perturbations, reducing the likelihood of local extinctions.</p>	<p><i>Indirect costs:</i> Possible compensation payments to those adversely affected by the decision to establish the reserve – for example:</p> <ul style="list-style-type: none">▪ Fishers and processors in the short-term▪ Alternative employment packages▪ Infrastructure costs of increasing tourism▪ Displaced communities, if relocated
<p><i>Ecosystem Services</i> – Other than fishing, protection of reefs provides protection against storms and coastal erosion, and increases assimilative capacity for pollutants.</p>	
<p><i>Biochemical Informational Services</i> – There are potential gains from pharmaceutical bioprospecting - future discoveries of important medicinal components</p>	
<p><i>Education and Research</i> – Reserves provide opportunities to learn about processes from 'undisturbed' regions</p>	

Source: adapted from Cesar et al. (2000b)

Box 2: Using economic analysis to argue for conservation of marine areas.

The Value of Portland Bight (Jamaica)

The Portland Bight Protected Area, an integrated marine and terrestrial conservation area located in the southern part of Jamaica, covers a total area of just under 1900 km², 72 percent of which is a marine area. A cost benefit analysis of the area estimated the net present value of the operational costs over a 25-year period at US\$ 19.2 million. The incremental benefits of the protected area over this same period were estimated at between US\$ 52.6 million and US\$ 40.8 million, based on two different tourism scenarios. This outcome projected justified the proposed expenditure on managing the area from an economic feasibility perspective.

Source: Cesar et al. (2000a)

Benefits and Costs of Coral Reef Management in Olango Island, Philippines

A case study of Olango Island, Cebu, which has 40 km² of poor quality coral reef, was analyzed together with its wetland habitat and mangrove contribution to the Philippines economy. The current annual net revenue range from the Olango Island reef was estimated at US\$ 38,300 to 63,400 per km². The wetlands add US\$ 389,000 to this figure. This relatively high income reflects the proximity of the Olango reef to Mactan Island, Cebu, a well-known tourist destination. Revenues accrue primarily from on- and off-site expenditures of diving tourists. The costs of managing Olango Island coral reefs and wetland habitats for improved net revenues and conservation would amount to less than US\$ 100,000 per year. This provides a convincing argument to government and the private sector to invest in the management of the Olango Island reef. Improved reef quality and wetland stewardship on Olango could easily result in a 60% increase in annual net revenues from reef and mangrove fisheries and tourism expenditures.

Source: White et al. (2000)

The Case of El Nido

El Nido is a coastal town located on the Philippine island of Palawan. Marine activities include traditional fisheries and dive-related tourism. Upstream logging was determined to have an impact on the marine environment. In 1986, it was determined that forest logging on the land surrounding the bay could limit the viability of the fisheries and tourism industries. A cost-benefit analysis predicted that over 10 years, logging would generate gross revenues of US\$ 8.6 million and the predicted lost revenues from fisheries and tourism (as a result of a degraded environment from logging) would be US\$ 6.2 million and 13.9 million respectively. Therefore, logging would produce a net negative cash flow. As a result, logging was banned in Palawan by the national government, and the bay was declared a Marine Reserve. A resurvey of the El Nido area was conducted in 1996. It revealed that the predictions about tourism growth were correct, and preservation of the unique forest ecosystem had allowed ecotourism to flourish. However, increased fishing pressures due to a variety of causes had resulted in overfishing and severely reduced populations from most high-value species of fish and shellfish.

This situation shows how coastal resource managers should pay close attention to ecological-social-economic interactions and their economic consequences. The economic analysis done here used some fairly simple assumptions and readily available data, but provided useful predictions about the likely economic impacts of the two main options (logging or no logging). The analysis helped to convince the government to ban logging in Bacuit Bay watershed in 1988. By 1996, the coral reefs of Bacuit Bay had recovered from the sedimentation damage they previously suffered from the logging. The tourism industry was flourishing. However, the typical haphazard, uncontrolled growth of small businesses and guesthouses, although providing an alternative livelihood to local residents, was become a threat to the ecotourism industry. Furthermore, local population expansion increased demand on the fisheries resources and artisanal fishers had decimated populations of high value marine species. SCUBA divers noticed reductions in numbers of large fish, although they were still attracted by the interesting corals, drop-offs and small reef fish. The government now faces the dilemma about how to control excessive fishing in Bacuit Bay.

Although this study was successful in persuading the government of the economic value of protecting this area, it is clear that adaptive management is key to successful long-term protection.

Source: Hodgson et al. (2000)

The costs of determining the economic benefits of a marine protected area are usually high. In some cases, values from studies conducted in other, comparable areas, can be carefully extrapolated and 'transferred' to the situation at another site with similar features. This may be most applicable within national boundaries, where political, cultural and economic systems are a constant, for instance networks of MPAs within national boundaries.

Partial benefits assessments have been carried out, and are particularly useful in cases where the benefits far exceed the costs. In some cases, it may only be necessary to quantify those benefits for which information is easy to access. For instance, in Kisite Marine National Park and Mpunguti Marine National Reserve off the south coast of Kenya (see Box 3), the protected areas demonstrate high economic value through fisheries and tourist revenues (more than US\$ 1.75 million per year). Although these values represent only a portion of the total value of the two protected areas, the benefits sufficiently outweigh the costs (estimated management and

opportunity costs of US\$ 190,000 per year) to justify the value of protection (Emerton & Tessema, 2000).

Box 3: A partial benefits assessment may be sufficient for the purpose

The demonstrated benefits of Kisite Marine National Park and Mpunguti Marine National Reserve

Kisite Marine National Park and Mpunguti Marine National Reserve (KMMPA) covers an area of just under 40 km² and lies between 3 and 8 km off the south coast of Kenya. Although administered as a single protected area by the Kenya Wildlife Service (KWS), Kisite and Mpunguti are under different conservation regimes. The larger Kisite Marine Park allows no consumptive utilisation, while fishing activities using traditional methods are permitted in the smaller Mpunguti Marine Reserve. Both form an important tourist destination, as well as containing important biodiversity.

KMMPA has a demonstrably high economic value. It is estimated that the MPA generates income in excess of US\$ 1.75 million a year in net revenues from fisheries and tourism, representing only part of the total park value. This value is far in excess of the estimated management and opportunity costs associated with the park of some US\$ 190,000 per year. Factoring in other, currently unquantified, economic benefits of the MPA and its component resources such as contribution to shoreline protection, marine productivity, wildlife habitat and nursery, cultural and aesthetic values would increase this surplus of economic benefits over economic costs still further.

Source: Emerton & Tessema (2000)

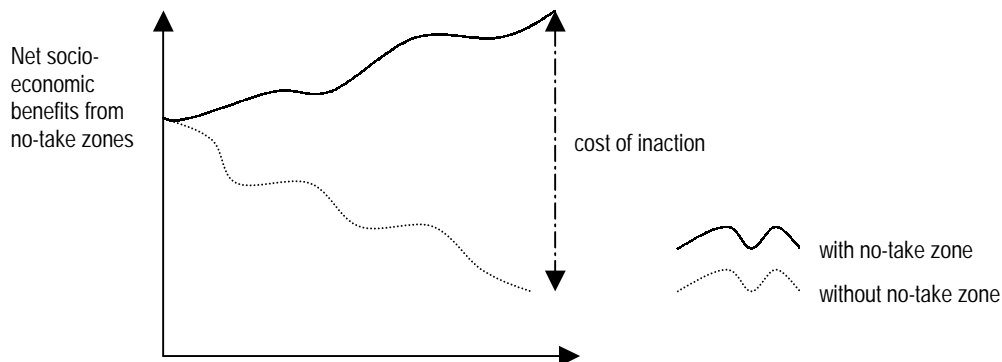
Box 4: Benefits from fully-protect areas

The perceived benefits of no-take zones:

No take zone (also known as fully protected marine reserves) provide both fisheries and ecosystems benefits and therefore benefit individual fishers and provide incentives for supporting protection. No-take zones also provide insurance against management loss. For instance, in the cod fishery, stocks were fished well beyond their capacity, affecting their resilience to high stress. Hence the slightest stress impacts this fishery multiple times the amount it ordinarily would.

The main benefits of no-take zones are larval spillover (egg production increased as number of fish reaching maturity increases in no-take zone and larvae are dispersed by ocean currents), non-larval spillover (fish stocks in the no-take zone increase over time and juveniles and adult fish migrate to adjacent areas, particularly as the no-take zone becomes overcrowded), nursery and feeding grounds (no-take zones in seagrass beds, mangrove areas and coral reefs provide nursery and feeding grounds for oceanic and reef fish from adjacent areas), and species protection (no-take zones provide refuges for protecting endangered species). The economic benefits of no-take zones are the benefits of increased yields – and these can be compared with the likely decline in fishery yields without the no-take zones.

Figure 1: The economic benefits of no-take zones



Source: Adapted from Cesar (2001)

Fishermen are often opposed to the establishment of marine protected areas because of the perceived opportunity costs (ie. the loss of income through lack of access to the area). However, it has been demonstrated at a number of sites that fishers can be convinced of the benefits of no-take areas providing they are kept well informed of how these areas are performing (for instance by involving them in the monitoring of these areas).

Artisanal Trap Fishers in Soufriere Marine Management Area

Catch in the Soufriere was seriously dwindling by the mid-1980s and this was further intensified in the 1990s by overfished fisheries and competing interests from tourists. In 1995, a management plan for the area was implemented for the Soufriere Marine Management Area (SMMA), an area covering 11 km of Soufriere's coastline. The main goals of this management plan were to rebuild stocks and restore fishery productivity and separate conflicting activities (primarily tourism and commercial fishing). Four no-take zones were interspersed between fishing areas, covering about 35 percent of the coral reef habitat in the SMMA. These reserves were expected to build up fish stocks (thus adding value to fisheries) and create a spectacular attraction for divers (reducing conflict by separating tourism from fishing). Additionally, fishers were given their own priority fishing areas where activities were restricted to fishing and Yachters are designated specific locations for mooring. The process to establish the management plan was highly participative.

However, artisanal trap fishers in Soufriere Marine Management Area, St. Lucia, were the hardest hit by the creation of no-take reserves and felt their voice had not been represented adequately as they had been displaced them from 50% of their fishing ground by the establishment of the no-take areas. A compromise was reached enabling a few of the oldest fishers (those with no alternative employment opportunities) to fish in part of one of the no-take zones and providing them with one year's compensation of US\$ 150 per month not to fish in the no-take zones. This helped tide them over until stocks were replenished in other areas, and in the end most of the illegal fishing was eliminated.

Recent results of these no-take areas show that the most popular fishing areas are now outside the boundaries of the not-take zones, where stocks have been sufficiently replenished and excess fish are spilling over into surrounding areas. Even in the zones where partial fishing was allowed, biomass has increased, showing benefits from even partial protection.

After five years, findings indicate that reserves have led to improvement in the SMMA fishery, in spite of the 35% decrease in area of fishing grounds. Interviews with local fishers showed that most felt better off with reserves than without. Younger fishers were especially positive about the benefits.

Sources: Roberts et al. (2000) & Roberts et al. (2001)

Fishers in the Aegean Sea

In Castalarisa, Greece, located in the Aegean Sea, local fishers saw the benefits of establishing a reserve to increase stocks and as a legal mechanism for limiting fishing in certain areas. They approached WWF to help them monitor changes in fish stocks resulting from fully protected areas. WWF created a program to employ fishermen to monitor the state of the fish stocks. In essence, the fishers created a form of property rights over the area, providing an incentive to manage the area for maximum benefit. They perceived the benefits of cooperation in the management as previously stock declines had severely impacted their revenue earning potential.

Source: Scott Burns, personal comment

SECTION 2: INGREDIENTS FOR FINANCIAL SUSTAINABILITY

A. Incentive Mechanisms

Scope

In addition to being costly and tough to enforce, negative incentive mechanisms like command and control measures are not sufficient for protecting marine protected areas because they provide no positive encouragement for sustainable use. People are far more likely to conserve marine resources if it is profitable for them to do so or if they see the costs of degrading the marine environment (Emerton, 2000). Unless it makes clear economic sense not to do so (ie. a clear cost) people are unlikely to limit profitable production and consumption activities that harm marine protected areas (see box 2 above). Therefore, economic incentives for conservation are important strategies for marine protected area management.

Incentives are specific stimuli designed and implemented to entice government, business, non-governmental organizations, or local people to conserve marine ecosystems (or to use the resources sustainably). This involves setting in place positive economic incentives, or rewards, for marine conservation, as well as eliminating disincentives and perverse incentives that encourage people to degrade the marine environment (for example fishing or fuel subsidies, concessions for industrial development on coastal strips, tax breaks for the development of export fisheries) (Salm et al., 2000).

Examples, Lessons Learned and Experiences

A Sense of Ownership Over the Resource

A very important positive incentive for marine conservation is giving individuals or groups clear responsibility for the resources they exploit. This involves putting in place a mechanism that enables them to benefit from marine conservation or to personally bear the costs associated with degradation. For example steps are underway to grant a consortium of local fishermen and tour operators the rights to use and manage a marine protected area on the Kenya coast, Diani-Chale Marine National Reserve, for their own benefit (ICAM 1999). Granting private property rights to these individuals is seen as a means of ensuring that these groups, whose activities currently contribute to marine degradation, have a clear stake in the conservation of marine resources for their own benefit and profit (Salm et al, 2000)

Products and Livelihood Alternatives that Support Marine Conservation

Local coastal communities whose livelihoods have been displaced or whose productive opportunities have been reduced as a result of a marine protected area may benefit from the development of new products and markets that support marine conservation. Such new markets can provide good incentives for supporting conservation. For example, in St. Lucia, many of the fishers whose livelihoods were being affected by decreased catch (due to the degrading fishery), and subsequently the enforcement of no-take areas, were able to switch to becoming boat taxis or guides for tourists, providing them with more stable and in many cases, higher income (Callum Roberts, pers. comm.).

Box 5: Incentive mechanisms

Alternative Markets in the Bazaruto Archipelago

In the Bazaruto Archipelago of Mozambique, one of the country's most valuable and fragile marine ecosystems, a number of activities have been started which aim to stimulate sustainable use by local communities (Reina 1998). These are focused on eco-tourism and artisanal resource utilization, which are being promoted specifically to compensate local villagers for the loss of land and fishing resources resulting from the establishment of a National Park. Simultaneously a range of new activities is being promoted, including permaculture and vegetable farming, which aim to take pressure of marine resources.

Source: Emerton (2000)

Economic Instruments

Economic instruments have also provided incentives to support protection of marine resources. In the Seychelles, a broad range of economic instruments have been recommended to encourage commercial and industrial producers to avoid marine biodiversity degradation in the course of their economic activities, including: (a) refundable beach waste deposits levied on hoteliers, refundable against cleanup, (b) a mooring bond be set for tour operators against the use of designated anchors and buoys so as to guard against reef degradation, (c) a variable scale of fishing license fees according to target species and fishing methods to promote sustainable fishing practices, and (d) a series of tax concessions and waived import duties on waste disposal equipment and clean technologies for industries operating in the coastal strip (Salm, 2000).

Incentives to the Tourist Industry

The tourist industry can reap large benefits from the presence of fully protected marine reserves and marine protected areas in general. Direct and indirect benefits to the tourism industry include: enhanced attractiveness of reefs (increasing satisfaction from diving, snorkeling and glass-bottom boat rides), protection of shoreline (maintaining sand levels on beaches), and support for pelagic fisheries (potentially benefiting sport fishing in deep seas) (Cesar et al, 2000c). Furthermore, the tourism industry increasingly uses MPAs as marketing tools. For instance, the Seychelles uses their MPAs in tourism marketing and promotion, as do many Caribbean island states.

Table 5: Revenues generated from reef-related tourism in Zanzibar and Mombasa (in US\$)

Revenue generated	Zanzibar	Mombasa
Dive and snorkel expenditure per tourist per trip	193	221
Total expenditure per tourist per trip	886	1,238
Total revenue/year generated from tourists involved in reef-related activities	15 million	34 million

Source: Westmacott et al. (2000b)

In areas where tourism is competitive, for instance amongst Caribbean island states, good quality reefs and beaches can be critical to the tourist industry, creating a clear incentive for their participation in the creation and management of marine protected areas. This can also reflect on the wider economies of these small island states, which are often dependent on the tourism industry.

Tradable permits

Although a significant source of revenue in some areas, systems for fixed dive fees often don't meet the economic needs of the area, and sometime they even challenge the ecological integrity of the area, if sustainable limits are not placed on the number of entrants. A system that is able to contain dive levels at sites within sustainability limits may be more sustainable mechanisms in the long-term. Although such a system has not yet been implemented, it has been studied in the abstract by Cheryl Ann Cumberbatch and written up in her M.Sc. dissertation at the University of York. Her thesis challenges the increasingly popular approach of charging minimal fixed daily and/or annual dive fees, establishing that this model is ecologically and economically unsustainable (in terms of maintaining resource use options and financing capability). A tradable permit system should: (a) issue different types of well-defined permits for different site, (b) limit these permits to ecologically sustainable levels and thus give them a value that can be accurately estimated, (c) make the permits freely tradable with limited restrictions on the scope of trading, (d) minimize the transaction costs involved in the trading, (e) enforce penalties for violating a permit (that penalty being greater than the permit price), and (f) enable producers to retain any profits they earn from trading (Cumberbatch, 2001). Such a permit system should provide incentives for sustainable diving within the protected area, giving the users (dive operators) a sense of ownership over the resource.

Licenses

Licenses (or concessions) that establish a form of property rights and encourage sustainable use, rather than only serving to collect revenue, act as incentive mechanisms. The longer the term of the license, the more likely the user will have a long-term interest in the area and therefore an incentive to use the resources sustainably. Such instruments are particularly useful for outer lying areas, where it is more difficult for the government to enforce protection (see box 6).

Box 6: Licenses that provide responsibility for the resources

Fishery Licence to preserve healthy fish stocks – the St. Brandon case

St. Brandon is located almost 400 km north of Mauritius. It consists of a shallow area some 60 km long and 25km wide with 55 sand cays and vegetated islands, lagoons and coral reefs. Only two islands are inhabited, both by fishermen working for one company. The area has been identified to be of regional importance for marine biodiversity conservation. St. Brandon has an intact marine fauna due to prudent exploitation by the licensed fishing company that sets conservative quota and only fishes part of the reef, thereby *de facto* establishing fully protected areas that act as 'sources' for adjacent areas. As the company holds a permanent fishing license and lease on 13 islands and a renewable lease on 15 more, it has a long-term interest in exploiting sustainably.

The key to its success in maintaining healthy fish stocks lies in an area based management system and a long-term interest in maintaining the resources. This is possible because of the absence of competition. A recently prepared management plan for the area by the World Bank recommends the fishing company as the guardian of the archipelago, to protect not only the marine but also the terrestrial resources (mainly birds and sea turtle beaches) as the remoteness of St. Brandon would render it impossible for the Mauritian government to protect it. Periodic monitoring would be carried out and prolongation of the renewable lease by the government would be dependent upon the effectiveness of protection. To expand the basis for revenue generation, boat based (live aboard) ecotourism has been recommended.

Cesar et al. (2000c)

Sport fishing licenses provide large incentives for conservation in Cuba

About 50 miles off the southeast coast of Cuba, roughly a thousand square miles of reefs, mangrove swamps, and islands, collectively known as Jardines de la Reina (the Garden of the Queen). This area is closely guarded and only accessed by a few Cuban lobster boats, foreign divers and light-tackle fishermen. Strictly enforced government laws against poaching protect the area, but this is likely not enough to ensure the pristine state the area has maintained. Further essential protection comes from a public-private joint venture between the Cuban government and an Italian company named Avalon. The government has granted Avalon a license to operate a substantial catch-and-release fishing camp. This area boasts the finest fly-fishing in the world for bonefish, tarpon and permit, which makes it in the company's best interest to ensure that nobody affects the area.

Source: Benchley (2002)

Compensation payments/ subsidies

In some instances, compensation payments may be necessary to entice resource users over to new practices. For example, in Soufriere Marine Park in (see box 1 above), it was necessary to compensate the users for a limited period of time for their loss. These 'positive subsidies' enabled the fishers to sustain their income during the period of fishery replenishment. In some instances it can also enable the use to move over to alternative livelihood options. Often the opportunity costs for not destroying the resources are relatively low, and compensation schemes or employment schemes are cheap investments for changing people's behaviors in favor of protecting the area.

Livelihood/business opportunities

Alternative livelihood opportunities arising out of MPAs can be attractive to local communities and business. For instance, in the Caribbean, experienced fishers are moving into the sport fishing industry for much greater profits than what they were receiving from overfished fisheries. Boat owners are operating water taxis on a part-time basis, and water taxi associations are being formed to maximize benefits to individuals. These types of opportunities must involve sustainable use in order for them to contribute to the sustainability of the protected area. They can be referred to as biodiversity business.

Biodiversity businesses are ventures for which biodiversity conservation and sustainable use of biological resources are integral and pro-active components of their business operation. Overall, they have a positive effect on water quality and protecting the ecological integrity of these systems, helping to sustain production of environmental goods and services (Megatelli 2001), while still maintaining a certain level of profit. Eco-tourism enterprises are a good example of biodiversity businesses. Their revenues are dependent on a certain quality of the environment where they operate.

Investment opportunities provide incentives for establishing or moving over to biodiversity businesses and alternative livelihood activities that support the protected area. A number of investment funds are being set up in different regions, focused specifically at providing equity for businesses that support biodiversity conservation (see box 7).

Box 7: Biodiversity Business Investment Funds

The Terra Capital Fund

Terra Capital Fund is a private equity fund with a current capitalization of US\$ 15 million. This is expected to double at a second closing within the next year to two years. The fund was established with GEF support as a demonstration of new financing mechanisms for the Convention on Biological Diversity. It is designed to attract private investment by leveraging GEF resources against other equity investments in enterprises involving commercially viable and environmentally sustainable uses of biological diversity in Latin America. It targets investments in sustainable agriculture, aquaculture, forestry, eco-tourism, non-timber forest products and other industries that have targeted links to biodiversity conservation and sustainable use objectives. The fund management company comprises A2R, a Brazilian investment bank, together with the Environmental Enterprises Assistance Fund (EEAF) and SDI, an environmental NGO.

Source: Megatelli (2001)

Small and Medium Enterprises Program (SME)

The IFC is administering a US\$ 20 million IFC/GEF Small and Medium Enterprises Program, which is fully funded by the GEF. The program was piloted in 1995 with US\$4.3 million and replenished in 1997. It primarily provides concessionary long-term loans to intermediaries in GEF member countries that on-lend to viable small businesses. The businesses must address GEF objectives relating to the conservation of biodiversity and climate change. Program funds are almost lent out, with final loan repayments expected by 2011. Based on program results, a successor financing vehicle is being considered that may be more conventional with possible IFC financing, and/or other investors while also drawing on GEF grants. It is expected that a successor program will require a more formal monitoring of environmental and benefit generation results. Some examples of SME Program initiatives include: (a) a US\$1 million loan to Conservation International which is on-lending to Mexican coffee cooperatives to ensure organic shade coffee is grown to standards while opening up a market with Starbucks; (b) a US\$500,000 loan provided to FUNDECOR (a Costa Rican Forestry Fund) that promotes private sector and landowner sustainable forestry and reforestation initiatives through 63 contractual arrangements; and (c) a US\$500,000 loan made to FCG (a small Guatemalan conservation trust) which decided to achieve conservation objectives by offering some small businesses loans to do ecotourism activities that may be replicable business models and help to move away from other harmful business practices affecting biodiversity.

Source: Megatelli (2001)

The Kijani Initiative

Kijani is a joint IFC/ World Conservation Union (IUCN) initiative aimed at conserving biodiversity in Africa through the biodiversity business sector. The initiative involves the creation of a Biodiversity Business Development Service and an Investment Fund to catalyze biodiversity-benefiting businesses in Africa. The Kijani Business Services will provide technical assistance to entrepreneurs to develop biodiversity business plans and foster critical partnerships between the conservation and business communities and promote market access for African biodiversity goods and services. The Kijani Capital Fund will provide private equity and debt finance to biodiversity business projects with capital requirements from US\$500,000 to 10 million. It will stimulate new foreign and domestic direct investments in the merging African biodiversity business sector.

Source: Megatelli (2001) & IUCN brochure

The Asian Conservation Corporation

The Asian Conservation Corporation has been set up as a holding company to invest in enterprises that are environmentally sustainable. It operates out of the Philippines, but can provide investment in other SE Asian countries. The initial concept for ACC was developed by WWF's Center for Conservation Finance. In January 2001, ACC was incorporated with \$12.5 million initial equity from private investors in the U.S., Philippines, Spain, and the UK. Additional potential investors that have expressed interest include the Asian Development Bank. To date, the corporation has invested in an ecotourism resort and a blue crab fishery company in the Philippines. One aim is to demonstrate that a company that is ecologically sensitive can still be profitable. The key to the success of this company is its ability to attract competent local entrepreneurs.

Source: Bruce Bunting, personal comment

Management Concessions

Private management concessions provide important incentives for conservation. Governments contract out management as well as financial control to a private entity such as an ecotourism establishment or other private business, an NGO, or a joint venture. Responsibilities for all or part of total management (including enforcement) of the area is transferred to a private entity and the park is run as a business. In general, operations follow commercial principles but profits from the tourism operations are generally re-invested in conservation activities.

Equity investment in these types of commercial ventures is an important source of initial income. However, internal rates of return have tended to be low, and therefore these types of commercial ventures can be considered high risk, particularly in developing countries, where the regulatory environment is cumbersome and creates obstacles for innovative and environmentally friendly designs (Riedmiller, 2000). Investment security is reflected on the type of land tenure – in many developing countries these concessions are only available on leasehold. “Another risk is that the capital recovery from investment in conservation is typically dependent on one single sector of the economy: tourism” (Riedmiller, 2000).

On the positive side, these types of venture provide enormous returns for local communities and society in general, particularly investments in local capacity building, employment opportunities, increases in fish stocks for fishers, and gains for biodiversity conservation. Additionally, innovative ways of approaching management concessions are currently being proposed – for instance, CCIF’s marine conservation concession model (see box 8).

Box 8: Management Concessions

Chumbe Island: An example of Private Sector Management of MPAs

Environmental legislation in Zanzibar now allows for protected area management to be delegated to private entities. Chumbe Island Coral Park (CHICOP) is now managed by a company formed specifically for this purpose. The government provided the initial incentive by allocating a lease and management contract to this company. The running costs of the park are now almost entirely covered by private income generated.

Chumbe Island is a small coral island of approximately 22 hectares off the coast of Zanzibar, Tanzania. Unlike much of the coast of Zanzibar, Chumbe Island is not plagued by heavy overfishing and blast fishing. This provides a rare chance for coral reef conservation. When the private concession was granted, the island was uninhabited and faced little immediate threat.

CHICOP was established in 1991. The original feasibility study provided for an investment of about US\$ 200,000 to establish the park and construct a visitors’ center and 10 guest bungalows. Revenue for running the park was to be generated with diving, snorkelling, glass-bottomed boat trips, nature trails, accommodation and restaurant services. Payback of the investment was expected to start after three years with an internal rate of return of 27%. However, unexpectedly three more years had to be spent in negotiating the official gazettement of the island as a protected area, the several management contracts, land lease, licenses and building, research, work and residence permits. Thus, the feasibility study had to be updated in 1994 based on an adjusted project design and more realistic conservation costs, resulting in more than three times the original investment. The projected prices for overnight accommodation had to be doubled.

A 1998 economic analysis estimated the overall investment by then to be nearly US\$ 1.2 Million, of which US\$ 220,000 were grants from a variety of donors for several non-commercial project components. Roughly US\$ 600,000 was spent on conservation, US\$ 100,000 on education and US\$ 500,000 on tourism infrastructure.

In 2000, the third year of commercial operations, the Chumbe project still receives less than the amount per guest that needed to break-even and has a lower occupancy rate than required. The project is, therefore, maintained with very cost-conscious operations and has required continued volunteer support. A recent updated feasibility study

based on nominal costs (not including volunteer work and opportunity costs) produced an IRR of 9% and a capital payback period of 7 years – less than what most investors in tourism facilities in Tanzania would consider attractive.

These data show the challenges of entrepreneurial MPAs in the initial years of operation. However, on the positive side, Chumbe has provided important community benefits, particularly in capacity building, biodiversity conservation and restocking of fisheries resources. As a sign of its success, CHICOP has won the prestigious 2000 UNEP Global 500 Award among others.

Source: Riedmiller (2000)

Komodo National Park Collaborative Management Initiative (KCMI)

Komodo National Park (KNP) is embarking on a collaborative management approach, involving all key stakeholder groups in the management of the protected area. These include the park authority (PHKA), local government, a Joint Venture between an international NGO (The Nature Conservancy - TNC) and a local tourism company (JPU), as well as local communities, government agencies, and private sector organizations. A tri-partite collaborative management agreement between the Joint Venture, PHKA and the local government is being developed to set out divisions of responsibility between the three bodies in conservation management, monitoring and enforcement and sustainable livelihood activities. PHKA will maintain a role in park management, but through separate collaborative management agreements. The involvement of local communities will be assured through their representation in the Community Coordination Forum.

The Joint Venture (JV) has been established as a for-profit company whose charter directs that any profits earned will be invested back into conservation. This will give the JV due respect among other commercial bodies involved in the area, while maintaining its credibility as an institution with conservation as its bottom line. A business plan for the Joint Venture has been completed. The JV has applied for a 30-year tourism concession by the Ministry of Forestry, which authorizes the JV to collect gate fees, establish and implement carrying capacity limits, and develop a tourism licensing system. The JV has applied for long-term funding from GEF/IFC to set up this tourism concession.

This represents a groundbreaking policy experiment for the government of Indonesia and for management of protected areas in general. The rationale behind the agreement was based on a proven track record of each partner in investing in KNP, as well as complementarities between the conservation NGO and the tourism-oriented private sector company. Over time, as the concession becomes more established, the JV plans to move toward co-management arrangements with local communities and local government.

In the long-term, the KCMI plans to bolster the limited capacity of PHKA to protect the resources of KNP and to make KNP a self-financing park, with its management costs being covered by tourism revenue. A 25-year management plan has been developed for KNP by the government, TNC, and other partners. In addition, an analysis of economic issues, a community enterprise assessments and a comprehensive tourism study have taken place, all feeding into establishment of the concession.

Positive and negative incentive mechanisms will be used to ensure the sustainable use and protection of the resources. These include: a micro-enterprise fund for local family-based businesses, a research and development of sustainable methods of marine resource use, and a community development grants to finance urgent welfare needs. Regulation and fines systems will also be put in place and/or strengthened.

Sources: Komodo Collaborative Management Initiative Project document, submitted to the GEF in September 2001, & Randy Kramer, pers. comm.

Proposed marine conservation concession in Raja Empat, Indonesia

Conservation and Community Investment Forum (CCIF), in collaboration with Conservation International, is proposing to set up a private park concession in Raja Empat, a marine area located at the western most tip of Papua Province in Indonesia. This area has been identified as an exceptional priority for marine conservation by Conservation International's rapid biological assessment team.

Marine conservation concessions provide an innovative and as yet untested approach to integrated marine management. The approach combines the traditional solutions and activities of the site-based conservation and enterprise development with the immediate and sustainable creation of a conservation concession funding mechanisms. A marine conservation concession will ensure protection and enforcement while the necessary conditions and objectives of a marine area management plan can be developed and realized. The marine concession will then provide the context for investment in non-destructive economic activities for local communities. Payments can be directed into a variety of local development projects ranging from employment in management and monitoring activities for the concession, mariculture, custom cultivation of clams, seaweed, live rocks, corals, etc., turning fishers

into pelagic fishermen, and eco-tourism. Over the long run, continued stewardship of the marine concession can evolve into the basis of economic development for participating communities.

The key to the success of a conservation concession is two-fold: (1) working at the local level to develop the social systems and local 'ownership' in the process; and (2) bringing together the people and information from different arenas (government, NGOs, investors) that do not normally collaborate. Incorporating sustainable businesses to provide an economic incentive for locals to preserve reefs is key.

The types of threats present will help to determine whether a conservation concession will work. For instance, in an area where the threat is too diffuse, it will be more difficult to establish well-functioning conservation concessions. However, in areas where the nature of the threat is more direct and easy to tackle, conservation concessions will provide a way to reduce or eliminate that threat almost immediately.

CCIF is ready to embark on a feasibility assessment to assess the economic, institutional, social and legal context of Raja Empat, as well as practical aspects of implementing an enforceable and effective management system in Papua to determine if a marine conservation concession can be successfully implemented in this area. If the feasibility study reveals that the concession is practical, they will seek funding for the long-term management of the conservation concession. The actual management of the concession will be bid out to private entities. CCIF is currently setting up centers of excellence in fisheries and coral reef management in Indonesia and the Philippines, building the capacity of the private sector to manage different elements of coastal areas. They intend this to provide the platform for private sector management of protected areas like Raja Empat.

Sources: CCIF proposal to conduct joint feasibility study for implementing a marine conservation concession in Raja Empat, Indonesia (2001), CCIF personal comments, & CCIF (2001)

B. Revenue Generation

Scope

Government budgets in developing countries tend to be limited and often changing, and protected areas are often the first to suffer the consequences (see box 9 below). Although government appropriations are a necessary source of income, it is critical for protected areas to maintain a diverse portfolio of income generation. This means securing revenues beyond the traditional government subventions, donor grants, loans and tourist revenues.

One of the most sustainable mechanisms for raising revenues to cover the recurrent costs of MPAs is to capture the economic values of the MPAs through a variety of economic, financial and fiscal instruments. This entails capturing resources from users of the resource through royalties, sales, user fees, taxation and licensing, as well as from non-users (donations, bequests, debt-for-nature swaps and business sponsorship). Often, and particularly in developing countries, it is best to capture these values at the level of the protected area. However, there are also different mechanisms that can leverage financing through national government.

Examples, Lessons Learned and Experiences

Donor and government funds

At the international level, traditional funding can be sought from bilateral donors either through governments, multilateral donors (e.g. GEF) or NGOs associated with the protected area. Debt-for-nature swaps and bioprospecting are also mechanisms negotiated at the national government level. Domestic economic instruments requiring government involvement include taxes, subsidy reduction, and deposit-refund systems.

In the initial stages of identification and development, the costs of management are best financed through the above-mentioned types of donor-assisted funding. However, it is during this stage that managers need to identify more sustainable financing mechanisms to raise revenue that will be reinvested into the management and protection of the area. Part of the strategy should be to keep the management and operation costs as efficient as possible – ie. running the management of the park as one would run an enterprise.

Direct use revenues

At the level of the marine park, user and admission fees can be used to finance the day-to-day management of the park. However, sometimes these fees have to revert to national government coffers before being reallocated through traditional budgeting mechanisms to the MPA. Although from an economic theory perspective, this is a more efficient way to manage a national economy, in many developing countries, this makes does not enable to the protected areas to run efficiently. Additional financial mechanisms used to capture revenue from direct users include diver fees, yacht mooring fees, filming licenses, research permits, sport fishing licenses, and concession fees charged to individuals or groups licensed to provide services to visitors within MPA (food, lodging, transportation, guide services, retail stores). For a more detailed list of these mechanisms, including their advantages and constraints, please see annex 1.

Box 9: Problems with conventional funding sources for marine protected areas

It is becoming more and more difficult to raise the cash necessary to maintain protected areas from conventional funding sources. Both government and donor budgets are falling in most countries, tourism is often highly variable, and there is stiff competition for private investment funds from other sectors of the economy, which is seen to generate higher, and more immediate, returns than marine conservation.

The case of Kisite-Mpunguti Marine National Park epitomizes many of these funding constraints. Throughout the decade, as public sector budgets in Kenya have fallen and expenditure has been rationalized and focused on priority areas for social development such as health and education, central government subventions to environmental conservation activities have been falling. The amount of program and project aid being granted to Kenya from external donors has also decreased substantially. Since 1990 all national parks in Kenya have been under the management of the parastatal Kenya Wildlife Service, meaning that as well as being accorded a much greater degree of autonomy, parks have been expected to become increasingly financially self-supporting.

However, relying almost entirely on tourist revenues for income, the Kenya Wildlife Service has been hit hard by the drastic downturn in tourism to Kenya over the last 5 years, which has resulted from political unrest and civil insecurity in key tourist areas of the country, including the coastal strip. As a whole the Kenya Wildlife Service's revenue base has been undermined, and budget allocations to Kisite-Mpunguti have also fallen substantially (from an average of US\$ 400,000 a year at today's prices during the late 1970s to only US\$ 20,000 in the last financial year (Emerton 1999)). Conventional funding sources are proving inadequate for Kisite-Mpunguti, which is having difficulties financing even its most basic management operations.

Source: Emerton (2000)

Capturing the Willingness to Pay of the International Community – Large Contributions

Opportunities to capture the willingness to pay of the international community clearly need to be capitalized on. This ranges from individual tourists and donors to private donor organizations and big donors to corporations. The key to all these entities is having a stake in the process. This means being able to see clear outputs from their 'social' investments, which requires transparency in operations. Often, the private donor and donor organization also want to feel a sense of ownership over the resource and a sense of involvement in the activities, making their contributions more tangible. This may involve visits to the site, participation in monitoring, naming honors (ie. naming a particularly site or protected area after a donor who provides a significant donation). It may also involve a type of high-end tourism, where the price of the trip far exceeds the actual costs, and the profits are directly invested in the park. For instance, for remote island resorts, this could provide a significant source of income where management costs are relatively low, and park income could spillover to the communities, providing them with an additional incentive to protect the resource.

Likewise, large corporation often have budgets for these types of 'social' and 'environmental' investments. They too would like to see tangible outputs from their investments. Investments of these sorts, particularly in partnership with a well-known NGO or protected area, increase their profiles with the general public. They also provide them with offset and mitigation mechanisms (particularly for the large oil and gas companies). Careful negotiation with these companies could provide win-win situations.

User Fees

User fees are one of the most common sources of direct income to marine protected areas. They are also the most widely applicable to many different types of MPAs. User fees are generally fixed prices that users pay for non-consumptive resource use. Entry into a marine protected area is the most common sort of user fee. Depending on the resource and the use type, they can be collected per day, per entry, per dive, or annually. In some MPAs, user fees enable the MPA to be self-sufficient (see box 10). However, it is considered high risk to rely wholly on one source of income, particularly given recent fluctuations in tourism levels (see box 9).

Often the uniformity of user fees means that they lack the necessary flexibility to restrict site-specific use of the resource. This may not always have a negative impact. However, it should be cautioned against determining the user fees by the need for revenue in cases where high usage threatens the integrity of the resource. In this case, user fees should be set higher to control access to the resource (see the Galapagos example in box 10). This of course will have more relevance in areas where there is greater demand for entry to the resource.

It is often practical to charge higher fees for foreign tourists, particularly as they are not paying income tax in the country, but also because they generally have a higher willingness to pay for entry to protected areas. However, this does not work in all cases. For example, in Phi Phi Islands Marine Park in Thailand, the concept of adopting a discriminatory pricing scheme was considered but determined to be not relevant to the situation because international visitors to this area do not have a higher willingness to pay than domestic visitors and imposing a higher entrance fee for foreigners could create an unnecessary psychological barrier for foreign tourists (Seenprachawong, 2001).

Factors that are important for ensuring effective visitor use fees include:

- Natural capital stock must be given adequate weight in any decision-making process (ie. high usage could lead to degradation of the resource)
- Visitor fees should provide funding for conservation and management of the area, including strengthening local government and supporting local people
- The economic benefits from visitors to the area must be clear at all levels of the decision-making process
- Some of the funds obtained through tourism must be invested in providing alternatives to local people – this could include investment in the development of local tourism activities
- Visitor use fees must be priced efficiently
- There should be effective monitoring systems established to monitor impacts at visitor sights

Box 10: Marine parks financed through user fees

Bonaire

Bonaire is a small island (288 km²) situated in the Southern Caribbean. It is surrounded by fringing reefs that are easily accessible and have provided the island with a valuable resource for the tourism industry. The accessibility of the reefs also makes them vulnerable, as being so close to shore they are affected by run off from land, poor wastewater disposal and seepage from septic tanks and overflow systems.

The Bonaire Marine Park (BMP) was established in 1979 with initial start-up funding for 4 years, which enabled a mooring system to be installed. The park functioned until funds ran out and, although supported by dive operators, it became little more than a paper park. BMP was revitalised in 1991 under the conditions that the park had to be self-financing within a new 3-year term of funding. Self-financing was achieved by the end of 1992 when a \$10 diver fee was introduced. The park covers the marine environment from the high water mark down to 60 meters and includes all 2700 hectares of coral reefs, mangroves and seagrass beds. It is a multiple use park with fishing and diving restricted in certain zones. The park has almost managed to eliminate destructive practices such as anchoring, spearfishing and coral collecting.

The income generated from the \$10 diver fees through the sale of the diver badges (tags) covers the salaries and operational costs of the park. The BMP staff includes a manager, 4 full time rangers and three shared administrative staff with the Washington-Slagbaai terrestrial park. Operational costs include boat and vehicle maintenance and running costs, the maintenance of the 70 public dive moorings, research and monitoring programmes and educational activities for the local children and teachers. For specific projects, the Park has to look to grant funding agencies for support. Income from divers has gradually increased as the number of divers has been increasing, while the \$10 fee has remained in place. Early and recent studies showed that these could be increased, and that tourists would still be willing to pay (see Figure 4 above). However, there has been a great deal of opposition on behalf of the dive industry to increase this fee.

Source: Scura and van't Hof (1993) and Kalli DeMeyer (personal comment).

Galapagos

Galapagos National Park (GNP) earns over \$5 million per year through user fees of various sorts. This is of high value to the government of Ecuador, and previously 30% of this revenue was reverted to the mainland. However, since 1998, the Special Law for the Galapagos has required 90% of this revenue to remain in the Galapagos Islands. Currently, 40% of the revenues are reinvested into the management of GNP, 5% goes directly to the management of the Galapagos Marine Reserve, 5% to the Quarantine and control system, 5% to the Galapagos National Trust, 20% to the Galapagos municipalities, 20% to provincial local governments, 5% to the Department of Environment and 5% to the National Navy.

In order to achieve this high level of revenue, Galapagos National Park charges a high fee, particularly for foreign tourists. This fee reflects the high willingness to pay for entry to the park.

<u>Galapagos National Park's Fee System</u>	<u>(US\$)</u>
Foreign Tourist.....	100
Foreign Tourist under 12.....	50
Foreign Tourist from the Andean Community or Mercosur.....	50
Foreign Tourist from the Andean Community or Mercosur under 12.....	25
Citizen/resident of Ecuador.....	6
Citizen/resident of Ecuador under 12.....	3
Foreign tourist non resident attending national academic institute.....	5
Tourist under 2 years.....	0

Bunaken: First Year Results from Entrance Fee System

In late December 2000, a law was passed in the province of North Sulawesi requiring all visitors to Bunaken National Marine Park to pay an entrance fee. Getting this fee system launched set a major precedent as it had to be approved by three government entities, the Manado Municipal Government, the North Sulawesi Provincial Government, and the Ministry of Forestry (Park's Authority) in Jakarta.

The system requires all foreign (non-Indonesian citizen) guests to purchase an entrance tag for Rp 75,000 (approximately US\$8) before entering the park. The plastic entrance tags are valid for a full calendar year and can easily be affixed to guests diving or snorkeling gear. Indonesian citizens are required to pay an entrance fee though using a daily ticket system of Rp 2,500 per day. Enforcement of the entrance fee system is conducted via spot checks by park rangers on land and at sea.

The Bunaken National Park Management Advisory Board (DPTNB), a multistakeholder board consisting of dive operators, environmental organizations, academia, pertinent government officials and villagers from within the park, manages all proceeds from sales of the tags and tickets. The BNPMB utilizes these funds to finance a number of high priority conservation programs in the park, including patrols and enforcement to abolish destructive fishing practices, control and disposal of plastic and other wastes entering the park's waters, marine conservation education of village children and adults, and reef and mangrove rehabilitation. A bi-annual report of the programs funded by the entrance fee system is published and made available publicly every 6 months. Additionally, a public audit of the entrance fee account is conducted each year and made available to all interested parties.

Total entrance fee receipts of Rp 418,187,500 were recorded during the first year, from 15 March to 31 December 2001. These fees were collected from 15,055 visitors to the park (including 5183 foreign guests, 8387 adult Indonesians and 1485 Indonesian students). It is interesting to note the predominance of Indonesian guests, who comprised 66% of the total arrivals to the park. This suggests that the DPTNB needs to pay particular attention to the aspirations and requirements of local guests, who tend to be more focused on land-based tourism facilities (such as public toilets, picnic tables, and clean beaches) than their reef-focused foreign diver counterparts. Although the entrance fees for local guests are currently minimal (Rp 2500 per visit), the large number of visitors shows that as conservation awareness increases locally, these guests could contribute a much larger percentage to conservation funding for the park. Foreign guests represented 34% of visitor numbers, but generated almost 95% of the entrance fee receipts via the Rp 75,000 plastic entrance tags sold to foreigners.

Expenditures of this income was reported include approximately US\$22,000 for the joint patrol system (including fuel costs, salaries and bonuses, equipment, training), about US\$3,000 for 30 information billboards erected in the park, and about US\$7,600 was transferred to the provincial government (as required by provincial law). Approximately US\$20,000 remains in the DPTNB account for funding 2002 activities. The DPTNB's 2002 optimal budget is approximately US\$200,000. An increase in the entrance fee charged to foreigners (targeted at Rp 150,000 and currently being discussed by the provincial parliament) should help generate a significant portion of the DPTNB's budgetary needs.

Source: Erdmann, 2001 & 2002

Setting the correct pricing structure for the fee can be challenging (see box 11), and in many cases, although the tourists might be willing to pay the fee, or more than the set fee, tourist operators are reluctant to increase their fees. This is particularly the case for all-inclusive resorts in the Caribbean.

In general, user fees rely on appropriate pricing policies to charge users for access to environmental goods and services. They are applicable only when sufficient user groups exist and when these users can afford to pay for access to the relevant coastal resources. Some issues with the implementation of user fees include the practicalities of revenue collection and monitoring.

Box 11: Setting the right price for the users

Assessing the user fees in Bonaire Marine Park through "Willingness to Pay" (WTP) surveys

In 1991, a WTP survey was conducted to assess users' willingness to pay for Bonaire's for non-consumptive use of Bonaire Marine Park (BMP). The results of the survey were as follows:

- An overwhelming 92 percent of visitors surveyed agreed that a user fee system should be set up, and said that they would be willing to pay the proposed rate of US\$10 per diver per year
- Approximately 80 percent of visitors surveyed said that they would be willing to pay at least US\$ 20 per diver per year, while 48 percent said they would be willing to pay at least US\$30 per diver per year and 16 percent said they would be willing to pay US\$ 50 per diver per year
- Using this information, an average WTP of US\$27.50 was calculated (excluding those unwilling to pay a fee)

Source: Cesar et al. (2000c) originally from Dixon et al. (1993)

Setting the correct user fees in the Seychelles

A WTP survey was carried out for the Marine Parks of the Seychelles to determine whether the current user fee of 50 Rp. per person per visit could be increased. The following results were produced:

- 96% of the tourists thought it reasonable to pay a user fee
- 74% were willing to pay the current fee or more
- 23% said they would prefer to pay less
- 3% did not want to pay at all
- the average WTP was 61 Rp (US\$12)

As a result, the fee was raised, with the potential to provide an additional US\$ 88,000 per year in revenue to the Marine Parks Authority. However, the resulting human behavior was not true to the survey results – divers went to places outside the park which were similar in quality or diver satisfaction – therefore actual revenues to the Marine Parks Authority decreased.

Source: Cesar et al. (2000c)

Additionally, user fees can be assessed individually for different users. Divers in general discern amongst the physical quality of reefs, including the numbers and sizes of fish present (see box 12). In general, they are willing to pay more than the fee they pay (Green, in press), particularly when they are likely to see a variety of large fish species (Callum Roberts, personal comment).

Box 12: Charging for the Quality of the Dive

In a recent survey conducted in St. Lucia by Nola Barker, a Ph.D. student at the University of York, determined that snorkelers were generally happy with what they paid for their snorkeling experience, but the divers were actually willing to pay an average of US\$ 20 (annual fee), double what they had paid for the experience. However, tourist operators tend to resist an increase in fees, particularly in the island states of the Caribbean, as they feel it will affect their competitive advantage given that there are a multitude of other destinations that tourists can choose. Barker also asked the divers whether they noticed a difference in the quality of the site that they visited and tried to gauge whether sedimentation levels had any impact on the quality of their experience. The results of these surveys have not yet been analyzed, but in general, Barker determined that the more experienced divers – ie. divers who had completed multiple dives prior to the interview, were able to tell the difference between a good quality site and a mediocre site.

Source: Nola Barker, Personal Comment

Sales and royalties and product concession fees

Revenues from sales and royalties can be sought through earnings from activities or products about or supported by the MPA – books, photographs, postcards, films or pharmaceutical products made at or extracted from products of the MPA (e.g. bioprospecting) or through direct sale of products associated with the MPA (e.g. t-shirts). Profits from sales and royalties have tended to be small, but more and more MPAs are seeing opportunities to capitalize on these revenues – particularly in cases where the MPA has a high profile – ie. one that has been 'branded' on the international market. Depending on the attributes of the protected area, the type of visitor and the marketing skills employed, there is potential to make significant returns of the sale of merchandise. "With a well-managed marketing effort, merchandise sales could raise as much as user fees" (Randy Kramer, personal comment).

Box 13: Revenue generation from sales, royalties and user fees in the Seychelles MPAs

The sale of tickets to tourists for entry into the Marine National Parks as well as boat mooring fees, filming fees, sale of coco-de-mer and tortoises and hiring of picnic facilities forms the basic revenue of the Seychelles marine parks. In 1997, the total revenue of the parks was Rp 1,990,058. Of this, 70% was derived from the user fees and less than 1% from the other forms revenue generation mentioned above. 68% of this revenue was derived from 2 of the 5 parks, which thus subsidised the running of the remaining 3 parks. The central management of the parks by the Seychelles Marine Parks Authority has meant cost cutting through sharing of administration expenses. Note that the wildlife products for sale have to be sustainably harvested and managed.

Source: Mathieu (1998).

Often, the protected area authority will enter into legally binding agreements with private organizations or entrepreneurs who market goods and services related to the protected area. These private sector groups will either pay a flat fee to sell their products in the protected area or they will return some share of their profits to the protected area.

Taxation

At the local level, taxes can be levied directly on goods and services provided in the MPA. At the national level, if it can be argued that the MPA contributes significantly to tourism, a percentage of the revenues from tourism taxes, bed taxes and airport departure taxes can be remitted to the MPA. For instance, Belize's Protected Areas Conservation Trust is financed by a US\$3.75 conservation fee that each tourist pays at the airport, generating more than \$600,000 per year (Spergal, 2001). In Cancun, hotels are charged fees for clean water. This money is then invested in the conservation of upstream freshwater supplies.

Voluntary fee systems

In Bali, some of the hotels add a \$1 per night to each guest's hotel bill. This money goes to a local conservation NGO. The guest is given the opportunity to remove this fee if he or she so desires. Revenues from such fees can also be collected for management of marine protected areas.

Debt-for-nature swaps

Debt-for-nature swaps provide opportunities for leveraging funds at the local level and setting up endowments for conservation activities.

Box 14: Philippines debt-for-nature swap

In 1993, WWF was able to purchase debt owed by the Philippine government to international commercial banks that had a face value of US\$ 19 million for a price of only US\$ 13 million. WWF obtained the US\$ 13 million from USAID and other sources. In exchange for WWF's cancellation of the debt, the Philippine government allocated US\$17 million worth of Philippine pesos to establish a permanent endowment for the newly created Foundation for the Philippine Environment. The income earned by investing FPE's endowment has been used to make hundreds of grants to NGOs and local community groups for projects to conserve biological diversity.

Source: Resor, 1997

Bioprospecting opportunities

One of the option values contained within coral reef ecosystems is the potential for discovering an important genetic resource for medicinal purposes. However, there are many potential hurdles to overcome should such an opportunity should arise. Royalty payments are considered the most common form of benefits that a host country can receive from bioprospecting, however, they are highly uncertain. Even if a new medicine is discovered, it can take decades from the time of its initial discovery to the time it is developed as a pharmaceutical agent (Guerin-McManus, 2001). Hence the real value from bioprospecting may come from trade of information rather than the product itself. Compensation can be realised in a number of ways, e.g. rental fees, rural employment, profit share, licensing fees, international technology transfer, tropical disease research, royalties and joint venture agreements, and part of this compensation can be used for MPA management, when the bioprospecting takes place in an MPA. (Cesar et al, 2000)

Box 15: Capturing the Commercial Value of Coral Reefs

International commercial interest can also be translated into funding, as evidenced by the use of payments for coral reef prospecting rights as a means of generating income for marine conservation. A number of useful applications of coral reef species for medical and pharmaceutical applications have been discovered, and many more are under development – for example compounds against cancer, treatments for heart disease, sunscreens and bone graft substitutes. There is a high level of international commercial and industrial interest in this potential. In line with this interest Imperial Chemical Industries has acquired the rights to develop a number of reef pigments for use as sunscreens for humans, and in 1992 the Coral Reef Foundation entered into a five year contract worth US\$ 2.9 million for the supply of reef samples to the US National Cancer Institute for use in cancer and aids screening programs.

Source: Spurgeon and Aylward (1992)

Tourism opportunities

In areas where there are species of high value to tourists, there exist distinct opportunities to capture a higher willingness to pay on the part of the tourists. For instance, in Islas del Golfo and Loretto Bay on the southern tip of the Baja of California, tourists come specifically to view the whales. Likewise, in Belize, the presence of whale sharks puts a higher value on the resources, and it is up to the local marine park to capture this value.

Box 16: Tourism Partnerships

Gladden Spit MPA in Belize contains a number of attributes that increase its value to tourism. The area contains an attractive barrier reef, is a spawning site for grouper and snapper, and attracts a large number of whale sharks. Because of the high biological value of this area, no-take zones have been proposed within the protected area, and Friends of Laughing Bird Caye, the local NGO responsible for the management of this area is developing a strategy for financing its management through high-level tourism fees. This is possible, particularly due to the presence of the whale sharks. In order to make this feasible, the NGO is proposing a potential partnership with a private tourism operator.

Source: Andy Drumm, pers. comm..

For general information on these and other financing mechanisms, including the advantages and constraints, please see annex 1.

Box 17: Lessons from Bonaire Marine Park

The marine park has tried for nearly seven years to increase the diver admission fee. This effort has been thwarted largely by the dive industry, which objects to divers being 'targeted' by fees. Information from a survey conducted in 2001 indicated that from the consumer's perspective, the fee could easily be doubled to \$20 per person per year. However, this has not been possible due to the 'stalemate' with the dive industry.

As a result, more creative means of financing the marine park have been sought. Three years ago, the marine park entered into a public-private partnership with the local marina to manage 40 public yacht moorings used by visiting pleasure boats. Overnight fees were established and have been collected for the past two years. Additionally, the Island Government agreed that the Marine Park can collect annual 'hire' fees for private moorings. The moorings remain the property of the owner, but the owner has to 'rent' the area of reef on which it stands in the amount of Naf 500 per square meter per year (approximately \$285). The park is in the initial stages of implementing this private mooring fee. Once this is in place, there are plans under way to charge on a similar basis for private piers.

The marine park tried souvenir sales as a source of revenue but was never able to capture the market, mainly because (a) the dive industry had cornered the market on souvenir and t-shirt sales, and (b) the marine park had no dedicated retail outlet and the offices are too far out of town to attract much direct visitation.

Grants and private donations always make up a reasonable proportion of marine park income, varying from about 15 to 30 percent annually. There was an attempt by the Netherlands Antilles to set up a trust fund for nature conservation. The nature conservation organisations on each of the five islands were persuaded to put forward representatives onto a specially designated board. Projects were solicited and a foundation was set up to administer funds. An estimated \$40 million was needed to cover the basic running costs of one marine and one terrestrial park per island. The foundation had some key national players, including the manager of the central bank of the Netherlands Antilles. However, it floundered when the Dutch grant funding agencies unanimously refused to tie their funds into a trust fund, even though the Dutch Government had voiced its support.

Source: Kalli DeMeyer (personal comment).

C. Cost-effective Management

Scope

The goal of protected areas managers should be to spend less and achieve more. In addition to balancing budgets and eliminated non-essential expenditure, there are other ways that MPAs can become more cost-effective. In particular, they can lower the costs of managing marine protected by sharing the costs and benefits of management with local stakeholders. Putting in place incentive mechanisms, such as new markets, licenses, etc., as discussed in the “incentives” section above is an initial step to increasing the cost-effectiveness within protected areas. In particular, involving key stakeholders directly in the management of the area, either by giving them clear incentives to share in the costs of management or by entering into co-management ventures with local communities or with the private sector (e.g. tourist operators) and other users of the resources, enlisting these agents to invest in and manage some of the costs.

The way to succeed with these types of ventures is to ensure that the benefits and costs are transparent and clearly understood by all those involved – in other words, these stakeholders must share a sense of responsibility over the resource. By sharing the costs and benefits of management with the broader group of stakeholders, two objectives are achieved: (1) the direct costs of management are lowered, and (2) the opportunity costs to local communities and are users are reduced.

Examples, Lessons Learned and Experiences

Cost-sharing mechanisms can range from sharing specific management responsibilities (ie. communities involved in monitoring and enforcement activities and dive operators maintaining mooring buoys-) to Commercially viable partnerships with the private sector, local communities and NGOs (see box 8 and 17).

Box 18: Co-management

Collaborative management in St. Lucia

New arrangements have provided a means of ensuring not just that funds are raised for marine conservation, but they accrue to the groups who are actually responsible, or bear the costs associated with, marine protected areas. For example in St. Lucia a collaborative management agreement has been established between government and a community institution with the capability of managing a marine protected area and administering a fee system. Fees raised will be placed in a separate government fund, which will make quarterly payments to the community institution for the management of the protected area (Geoghegan 1996).

Source: Salm et al. (2000)

The Ucunivanua Project: benefits from involving communities in co-management regimes

In the early 1990s, residents of Ucunivanua village in Fiji recognized that the marine resources they depended on were becoming scarce. In the past, village elders recalled collecting several bags of large *kaikoso* (a clam found in the shallow mudflats and seagrass beds) in a few hours. However, by early 1990s, a woman could collect only half a bag of small clams after a full day on the mudflats. One solution identified by the community was to return to their traditional management practice of setting up *tabu* areas – regions that were temporarily closed to fishing to replenish stocks. They experimented by setting up a 24-hectare *tabu* area on the mudflat and seagrass bed in front

of the village. A management team was assigned to stake out the area and, with assistance from a team from the University of the South Pacific and the Biodiversity Conservation Network, developed and implemented simple monitoring methods. The management team monitored the site twice in the first year and annually thereafter. The results showed an increase in numbers and size of clams, in some cases, the biggest clams found in three generations. Because of the work involved and the results, the entire Ucinivanua community became invested in the *tabu* area, and once they saw the effects of the *tabu* area, they decided to set up other *tabu* areas in mangroves and coral reefs to protect one species of mud lobster, several species of sea cucumbers and several coral reef fishes and invertebrates, all of which were of some economic or cultural value to the village members. The Ucinivanua community is considering converting some of these temporary *tabu* areas into permanent no-take sites. Soon other communities across Fiji became interested in setting up their own *tabu* areas and customary marine reserves are now being set up in four other sites across Fiji, covering a total of over 15 km² of protected coastal habitat. The Ucinivanua project also influenced government policy. The government policy makers are now planning to adopt traditional Fijian customs to manage marine resources and have a full-time program focusing on locally managed marine reserves within Fiji's coastal waters. This effort is also being extended to other island states in the Pacific, and lessons are being shared internationally amongst local communities.

Source: Tawake et al. (2001)

Bunaken National Park: Co-management with the private sector

In Bunaken National Park, the park authority has been facilitating a participatory management approach, developing strategic partnerships with government agencies, the private sector and local communities in order to access necessary technical and financial support.

Strong management support has come from the Sulawesi Water Sport Association, an association of diver operators located primarily outside the park. SWSA is now actively involved in monitoring and enforcement activities, using funds collected from the different dive operators. For example, they financed the mooring buoy program and got active participation from the local communities in the management of the buoys in order to prevent the mooring buoys from being stolen. Furthermore, the SWSA has set up a scholarship program to send local high school graduates (from within the park's boundaries) to university to study marine biology and tourism management. They have purchased fuel for patrol boats, facilitated community participation in enforcement and collect entrance fees from visitors. Furthermore, they have developed incentive programs within their own industry to encourage best practices by developing a code of conduct.

Source: Randy Kramer, personal comment

In the case of the Great Barrier Reef, the private sector has become informally and indirectly involved in the management of the area. Currently, the Government of Queensland is working with the tour operators to determine what role they currently play in management of the Great Barrier Reef MPA. Initially, they have come up with a table (table 5) showing which services the tour operators and government provide individually and together.

- Resorts provide some rangers
- Commercial fishers pay for dedicated access to moorings
- Diver operators trained to give evidence of non-compliant fishers
- Involving indigenous Aboriginal islanders in management of reef – community-based rangers - Training and employment program, self-management of turtle and dugong hunting permits

Table 6: Costs to tour operators and government of managing the Great Barrier Reef MPA

SERVICE PROVIDED	Tour Operators	Government
Site facilities	Moorings, pontoons, toilets on vessels	Moorings, toilets and facilities on islands
Access		Boat ramps, navigation aids, nautical advice, dredging
Transport	Vessels, aircraft, helicopters	
Food/beverage/goods	Fuel, fuel tax, maintenance, wages Food, beverage, goods	
Marketing	Own tour marketing	Destination and tour marketing, business advice
Fees	EMC, PAAF, EIS	Permit assessment and fee and collection
Insurance	Insurance	
Other business costs, tax	Business costs, tax	Business costs, tax
Marine park promotion	Some proportion of operator marketing promotes MPA / WHA values	MPA/ World Heritage Area promotion
Interpretation/ education (capital)	Equipment for interpretation/ education on tour, snorkel rest stations	Off-site facilities, e.g. Reef HQ, interpretive centers, Heron Island, boat ramp signs
Interpretation/ education (operational)	Interpretation/ education on tour, training of staff	Marine Park officers at boat ramps/ in field, training; accreditation of operators & staff
Site Maintenance	Toilet pump out, bringing waste back to land, on-site maintenance	Public moorings, bins, cleaning, rehabilitation (islands)
Pest control	Pest control - COTS	Pest control – COTS
Site monitoring	Site monitoring	Site monitoring
Research	Research – own & marine tourism industry contribution to CRC, other research	Research - general CRC
Management planning & policy dev't	Participation in planning and policy and legislative framework development	Planning, policy & legislative framework development – staff wages, travel
Surveillance/enforcement	Reporting	DDM – Vessels, aircraft DDM – Fuel, maintenance, wages, charter

Source: Sally Driml, Queensland government

In the long-term, co-management approaches should lower costs. However, often there is a high initial cost in getting these types of systems off the ground. A recent study done through the Economy and Environment Program for Southeast Asia (EEPSEA) explains how participation has high transactions costs (time and resources), particularly for the local communities. These include meetings, training courses, sitting on committees, monitoring fellow villagers to see that they follow the rules, imposing penalties on those who do not, etc. (Sumalde et al., 2001).

Box 19: Transactions costs of co-management

To see how transactions costs affect the success of community-based resource management, a study examined a coastal conservation program in the San Miguel Bay of the Philippines. It found that these costs were quite significant, and that the community groups shouldered a large proportion of them, generally without financial compensation. It also found that these costs were key determinants in the success or failure of the scheme's various projects.

In general, the people's organizations were found to have contributed almost 78% of the total transaction costs – the highest of all the participating organizations. Looking at specific activities, it was found that law enforcement, which amounted to 18,925 person-days, consumed most of the time. This was due to the fact that the biggest problem in San Miguel was the presence of small and commercial trawlers which should have been phased out of municipal waters.

Source: Sumalde et al., 2001

PART 3: OPTIONS AND CONSIDERATIONS FOR MPA NETWORKS

Scaling up conservation approaches means looking at marine protected areas as critical nodes in the greater conservation of the oceans' resources. As such, MPAs can be grouped (scientifically) into networks that built on natural factors of mutual replenishment and resilience over a wider scale, enabling them to recover from stresses at a much faster rate.

From a scientific and conservation perspective this lifts conservation to a higher level enabling conservationists to protect larger spatial areas. From a financial sustainability perspective, it brings additional challenges, as well as opportunities. How can we find mechanisms that not only ensure financial sustainability in individual MPAs, but also lift financial sustainability to the level of a network of marine protected areas that are interdependently connected.

Firstly, when identifying the networks, it will be critical to ensure that they include areas of interest to the broad public (or areas of particularly high tourist value) in order to generate sufficient revenues to subsidize MPAs that aren't attractive to most visitors. When focusing on the sustainability of a network of protected areas, the intent should be to make the network sustainable as a whole, rather than each individual MPA. This will ensure that even those MPAs with limited options for a diverse portfolio of financing mechanisms are able to cover their basic costs.

One of the most obvious benefits of scaling up to the network level is cross-subsidization of MPAs. This is not uncommon within many national boundaries (see box 13), where both marine and terrestrial PAs contribute part of their income to the wider network of protected areas, either directly or indirectly (see box 20). It may not always be the most efficient distribution of revenues, however it is one way of ensuring that all PAs have some of their basic costs covered. Some of the challenges when dealing strictly with a network of MPAs will include finding ways to creatively fit this within the context of government protocol.

In addition to sharing funding, there will probably be ample opportunity for sharing staff, technical expertise and monitoring responsibilities. Costs could also be lowered by transferring lessons across sites – ie. creating a learning portal for a specific network of MPAs.

Box 20: Unequal distribution of benefits in the Kisite-Mpunguti MPA complex, Kenya

The high economic benefits associated with the Kisite-Mpunguti MPA complex (KMMPA) provide a strong justification for its status as a MPA, and demonstrate that – in theory – the park is an economically worthwhile use of natural, financial and human resources (See Box 3). Yet, support for marine conservation is low around KMMPA, and park management is difficult in practice. The major issue in KMMPA is the unequal distribution of benefits between the different stakeholders. The groups who bear the major direct costs and opportunity costs (i.e. foregone benefits) associated with the MPA (KWS and local communities) receive a disproportionately small share of the benefits it generates, while its major beneficiaries (private sector tour operators) bear few of the costs associated with its management.

More than 3,000 people live on Wasini Island, alongside KMMPA. Almost all rely on fishing as their main form of livelihood. The majority of these people lose out in economic terms from KMMPA, because they have been excluded from their traditional, highly productive fishing grounds in Kisite. These losses far outweigh the local gains from the park in terms of tourist-related income and improved fish productivity. Despite a requirement for visitors to Wasini Island to pay a small fee to the village authorities, only one private tour operator attempts to abide by this

arrangement. Even when operational, the improved gains from the benefit-sharing arrangements did not balance the local losses incurred. Most community members will continue, in the absence of tangible economic benefits, to regard KMMPA as an economic liability rather than asset and to feel a high level of antipathy towards both KWS and private sector tour operators.

Source: Emerton & Tessema (2000)

Networks of MPAs that cross international boundaries elevate the challenge to a higher level. However, in the case of the Meso-American reef, this challenge has been taken up. TNC and WWF are currently working with four trust funds in four different countries to create an ecoregion endowment fund for the entire ecoregion (see box 20). However, as we have seen from the Bonaire example (box 17), these types of regional trust funds must have full buy-in from all stakeholders at all stages. SPREP is currently setting up a similar mechanism for the Pacific island states.

Box 21: MesoAmerican Reef Regional Trust Fund (MRFM)

A regional financing mechanism is being established for the MesoAmerican Barrier Reef System, a unique marine ecosystem bordered by Mexico, Belize, Honduras and Guatemala. The MRFM has a long-term endowment goal of \$25 million and will finance projects for the conservation and sustainable use of the Reef. There are four country funds participating in the MRFM, including:

- The Mexican Fund for Nature
- The Protected Areas Conservation Trust of Belize (PACT)
- The Biosphere Fund (Honduras)
- The Guatemalan Conservation Fund

The MRFM is being designed to fundraise, receive, manage and disperse funds to priority areas and projects for the conservation of the Reef. The mechanism will select, fund and evaluate environmental projects for the Reef under established guidelines and procedures.

The fund is being capitalized with funding from the Summit Foundation, the IDB, and a WWF Donor. It will be set up as a private fund and decision on spending will be made by a board consisting of government, NGOs and other representatives. The fund's priorities will be based on the main threats to the area. It will provide funding to projects that address these threats in key biodiversity regions, including setting and financing up of MPAs.

Mary McLellan (February 2002 trip report and personal comment)

For these types of networks, there may also be potential to access regional financing. For instance, creating programs to reinvest tax revenues from the Western Pacific Tuna fishery back into the management of this and other resources (Scott Burns, pers. comm.)

Another potential way to increase the effectiveness of MPAs within a network is to establish incentive mechanisms for better management on the ground, encouraging competition amongst MPAs (e.g. competing for funds based on the effectiveness of their management). In order to do this effectively, the criteria for good management need to be identified. This is being done in the Philippines, where a certification system and an economic valuation framework are being developed and applied to community-based MPAs. The certification and rating system encourages improved governance and standardization of field results by attaching ecological and monetary values to well-managed MPAs. This then fosters more investment. Furthermore, the results will, in time, serve to indicate the most effective management methods (see www.pewmarine.org).

PART 4: DIVERSIFIED PORTFOLIO AND ADAPTIVE MANAGEMENT

One criterion necessary for long-term sustainability of marine protected areas and networks is having a diverse portfolio of revenue earning mechanisms. A diverse portfolio of revenue mechanisms could include (a) national income from the government budget; (b) local income, such as revenues from user fees, licenses, sales and royalties, etc.; (c) endowment funds from a trust; (d) co-management agreements, passing off some of the costs of management to primary stakeholders; and (e) voluntary donations. (See box 22). The key is not to rely on any single source of revenue to cover the costs of management. The basic recurrent costs should be covered through reliable sources, and then variable costs can be covered by less consistent sources of funds, such as donor grants.

A second criterion is adaptive management. This includes being able to set and monitor indicators, watch for changes in the political, economic and social environment, monitoring trends in local, national, regional and global economies (e.g. tourism trends), predict changes in markets, capture option values of the resource (e.g. future benefits from potential discoveries, changes in technologies, etc.) and constantly link the science of biodiversity conservation to the benefits received. This requires managers to constantly be looking beyond the boundaries of the MPA or network of MPAs, employing dynamic approaches to management and seizing opportunities as they arise.

Box 22: A portfolio of financing mechanisms in Saba Marine Park

The Saba Marine Park was established in 1987 by the government of Saba in the Netherlands Antilles. Management of the park is delegated to an NGO, the Saba Conservation Foundation, which has authority to carry out all management activities. The NGO was created to manage the park.

The park was established with grants from the Island government, Dutch Development Corporation, and private foundations, totaling \$270,000. The Saba Conservation Foundation then embarked on a three-pronged revenue generation strategy emphasizing user fees, souvenir sales and voluntary donations. The strategy also focused on keeping operating expenses low by using volunteer services wherever possible, soliciting in kind goods and services, and requesting grants for special projects, such as research and monitoring. The Island government continued to subsidize operating expenses for three years beyond the start-up period as the revenue streams were coming on line.

User fees were first charged only to divers (US\$1 per dive) and snorkelers (US\$1 per visit to the island). Commercial operators of dive and snorkel excursions collected the fees and turned them and diver/snorkeler statistics over to the Foundation each month. Later, the fee was doubled and a yacht mooring/anchorage fee was introduced. These fees bring in about half the park's revenue. Souvenir sales bring in another 32 percent, and voluntary donations and other income provide 17 percent. Donations are generated through a "Friends of the Saba Marine Park" promotion that encourages park visitors to register, give donations, and receive information via a newsletter. The "Friends" organization is registered in the USA so USA visitors can give tax-deductible contributions on site or by mail after their return.

Source: Nature Conservancy, 2001

Jack Ruitenbeek and Cynthia Cartier have recently written a paper which explores the hypothesis that "adaptive co-management can be regarded an emergent strategy under specific conditions." They suggest that adaptive co-management often occurs naturally, and that policies should passively guide the emergence of adaptive co-management. As such, policies should bring consciousness and awareness into the adaptive co-management regime, enabling learning within a complex system and adaptation as a result of this learning (Ruitenbeek et al., 2001). This

suggests that adaptive management is a process of learning and adjusting and enabling agents within the management regime to adapt their behavior as and where appropriate. Awareness is critical to this process of learning and adaptation.

FINAL COMMENTS

This paper identifies four areas of focus for achieving financial sustainability in MPAs and networks of MPAs. Examples in these areas have been drawn from research and application *in situ* around the world. However, this is by no means a comprehensive assessment of mechanisms for financial sustainability. It is a first step towards drawing together lessons learned and thinking 'outside the box' towards long-term financial stability and adaptive management within networks of marine protected areas in order to ensure the resilience of coral reefs against change. Future efforts to build on this initial documentation should look at which mechanisms work best in which situations (geographical, regional, political, institutional, cultural and social), and what types of capacity are needed to guide these mechanisms and ensure the long-term sustainability of the world's coral reefs. They should also focus on the benefits and constraints of working at a network level within these same situations and seek to understand which mechanisms best enable continuous, adaptive and sustainable management of marine protected areas in the tropics.

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ANNEX 1: Financial Revenue Earning Mechanisms for Marine Protected Areas

Source or Mechanisms	Definition/ example	Who can use it	Advantages	Constraints
Government appropriations	Funds appropriated in national budgets for protected area management	National protected areas agencies	-Regular, recurrent income -Compatible with national environmental priorities	-Usually insufficient to meet management needs -Additional funds not usually available -Complex budgeting and accounting rules -Government priorities and budgets can change with political and other changes
Taxes, Levies, surcharges	Fees and levies imposed on certain activities, sales or purchases (e.g. tourism tax, bed tax, airport tax, fishing license, diver operator license, etc.)	Government imposes and collects; proceeds may be earmarked (e.g. for protected area budgets, trust funds, etc.)	-regular, recurrent income -use generally unrestricted -can capture economic benefits from resource uses (tourism, fishing, boating, etc.)	-May require special authorizing legislation -May generate controversy, especially among constituencies to be taxed (requires public education on advantages and purpose of levy) -Can result in negative activities if sole purpose is to raise funds -Goes through central government coffers
User fees	Charge for non-consumptive use or visitation (usually 'per person' or 'per vehicle'; may be daily, seasonal or annual, may be charged to tour firms bringing escorted groups	The entity with jurisdiction over a protected area may collect fees itself or designate another party to do so on its behalf, depending on applicable law	-Regular, recurrent income -Use generally unrestricted -Embodies 'user pays' principle -Can be used to regulate access, control over-use, manage visitation flow among protected areas -Easy to implement in areas with limited number of access points	-not appropriate for little-visited areas (projected revenue should exceed cost of collection) -Potential equity issues (can be addressed by lowering fees for national/local residents, etc.) -Introducing fees for areas that previously were free can generate controversy (requires local outreach and education before implementation) -Costs involved with collection of fees -Challenges of setting the correct price -After fees are set there is little flexibility to change -May fluctuate
Leases and concessions for products and services	Legally binding agreements between the entity with authority over the protected area and private organizations or entrepreneurs who market goods and services related to the protected area and return some share of the profits, or a flat fee	Protected areas agencies, private reserves, NGOs, businesses	-An effective mechanism to provide services with little up-front investment by the protected area -Concessionaire incurs the risks associated with potential non-profitability -Concessionaires bring marketing and business skills to the table -Frees management agency to focus on resource protection -Provides opportunities for local entrepreneurs	-Concessionaires operate for profit motive, may not share values of protected area and need to be carefully monitored -Estimation of fees is complex and difficult; need to ensure healthy and safe service at reasonable price to visitor; fair return to both protected area and entrepreneur -Not appropriate for little-visited areas

Sale of goods and services	Gift and souvenir shops, sale of items such as maps and guides, fee-for-service tours, anchorage, mooring, equipment rental, camp or picnic space rental, exhibit entry, etc.	Park agencies, NGOs, concessionaires	-Goods and services can do double duty as sources of income and visitor education, promotion -Generally does not require additional legal authorization; easy to keep proceeds within area	-Initial investment required for production of inventory of goods, recruitment of providers of services -Goods and services should be limited to those related to protected area purposes -potential for competition with other local providers of goods and services
Case-related marketing	Sale of mostly intangible items (membership, voluntary add-ons to hotel and restaurant bills, etc.) - primary value is purchaser's knowledge of helping conservation	Most often used by NGOs	-Combines promotion, education and fundraising -In some cases contributions may be tax-deductible -Markets can be easily identified (park visitors, NGO members, etc.) -Involves local business community in protection	-Many areas have no built-in market, must develop visitor logs, etc. -Requires fairly sophisticated understanding of marketing and what will sell, or an experimental approach -Potential for market saturation
Biodiversity prospecting	Contracts in which a pharmaceutical company or other entrepreneur secures right to genetic resources (bio. materials collected and processed for analysis) in return for cash payments and/or royalties on any medicines or products developed	Generally government or parastatal agencies, sometimes private research institutions with consent of appropriate government agencies	-up-front cost is minimal -opportunity to train and employ local researchers in collection and initial processing	-speculative enterprise, impossible to know potential financial return up front -requires skilled legal representation for contracts -royalty payments may not be received for decades if at all, depending on the actual value of the resources on the global market
Debt-for-nature swaps	Transactions involving the forgiveness or buy-back of foreign debt in return for commitments to conservation (usually local currency payments into a conservation project or fund)	Key actors: national government, country or commercial bank to whom debt is owed; intermediary organization that raises funds to purchase discounted debt (commercial swaps), national beneficiary (often a parks trust fund); to participate the country must have a significant amount of commercial or bilateral debt in arrears	-Reduction of national debt, substituting local currency payments to national fund or bonds for hard currency debt service -donor increases conservation investment by buying debt notes below face value and redeeming them at full value -net transfer of funds to conservation purposes -can help to capitalize national protected areas trust funds	-potentially controversial due to debt legitimacy issues -valuable only when debt is deeply discounted or creditor is willing to write off -Requires policy authorization and full participation of national governments -Can be complex to execute and may require the involvement of technical experts from multiple government agencies -Financial leverage achieved by a debt-for-nature swap may be eroded by subsequent local currency devaluation or runaway inflation

Global Environment Facility	Funding mechanism that supports activities under Biodiversity and Climate Change conventions, implemented by the World Bank, UNDP and UNEP	Governments and NGOs	-Source of new money for conservation planning and implementation -often used to finance trust funds	-Restricted to areas of global significance and to the incremental costs of their protection -Application procedures can be time-consuming and cumbersome -Generally not applicable to ongoing or recurrent costs
Bilateral donors	Aid agencies of developed countries, e.g. USAID, JICA, Gtz, DfID, SIDA, etc.	Most aid is government-to-government but there are significant opportunities for funding NGO activities	-Significant source of revenue, particularly for start-up and public involvement aspects of protected areas management	-funds will be restricted to specific uses -generally not a source for recurrent costs -long application procedures and complex reporting requirements -often has to be sourced through the national government
Philanthropic foundations	Grant-giving organizations	Generally available only to nonprofit organizations	-can be a significant source of revenue for specific project activities or start-up of new programs	-not a source of recurrent funding -intense competition for limited funding often leads to significant investment of effort in proposals with low-to-medium chance of funding
Corporations	Sponsorship or other types of voluntary payments by companies	Park agencies, NGOs	-Generally a means of raising both national and international support for facilities or management -Corporate donors' expectations often can be met with simple acknowledgement placards -means to link companies that benefit from protected areas to supporting them (tourism, hospitality industries)	-Often corporations desiring to be sponsors are those with whom the protected area may not wish to be associated (resource exploitation sector) -What corporate sponsors get in return needs to be carefully limited before donations are solicited and accepted.
Individual donations	Gifts by individuals through a variety of mechanisms – direct gifts, memberships, wills, bequests, etc.	Generally NGOs but sometime protected areas agencies	-Potential donors come to you and only need to be asked -No cumbersome application process -Can build donor loyalty over time -Usually unrestricted gifts	-Requires insight into potential givers and what motivates them -Some gifts, especially bequests, may take years to cultivate and eventually realize -Can be a significant source of funds for a MPA
Trust funds	Capitalized through different donor agencies or funding sources and managed and controlled by an independent board of directors	Park agencies, NGOs	-Sustained, long-term funding for MPAs -Can extend the lifespan of a grant -Channel large-scale grants to many small-scale users -Can be set up for different purposes: a single protected area, a entire protected-area system, a transboundary protected area or ecoregion, small grants to community. -Is kept separate from other sources of money (such as government budgets)	-Potentially have high admin costs -May generate low or unpredictable investment returns, esp in the short term, if not a well conceived investment strategy or if particularly sharp changes in the markets.

Source: adapted from Nature Conservancy (2001)

ANNEX 2: List of Experts

Name & Affiliation	Email	Expertise
Bunce, Leah NOAA	leah.bunce@noaa.gov	Socioeconomics of coral reef management
Cesar, Herman Cesar Env'tal Econs Consulting Free University	herman.cesar@ivm.vu.nl	Economic valuation of natural resources (coral reefs, tropical fisheries, protected areas, coastal zone, etc.); development of management plans for parks and protected areas (both terrestrial and marine); development of economic instruments for natural resource management; socio-economic assessment and stakeholder analyses of natural resource use and human-induced threats; training in economics of coastal zone management, environmental economics, economic valuation, etc.
Claussen, John CCIF	john@cea.sfax.com	Initial feasibility for setting up marine concessions in SE Asia; Efficiencies in the marine aquarium fish trade
DeMeyer, Kalli CORAL	kdemeyer@coral.org	Bonaire National Park – experience with setting up a system of user fees; currently developing a system of best practices for MPAs (also looking at certified management)
Dixon, John World Bank (until Sept '02)	jdixon@worldbank.org	Considerable work on valuation of protected areas, coral reef ecosystems, financing instruments, etc.
Emerton, Lucy IUCN Asia	lucy.emerton@iucnp.org	Environmental economist; experience with sustainable financing in protected areas; current focus is Asia but also advises in Africa and Latin America
Erdmann, Mark	flotsam@manado.wasantara.net.id	Experience in Bunaken setting up a user-fee system and cost-effective management practices with local entrepreneurs
Hardner , Jared Hardner & Gullison Associates	jared@hg-llc.com	Developed the thinking behind conservation concessions – currently looking at options for applying the concept to marine sector; Hardner & Gullison have a strong protected areas focus
Hunnam, Peter Independent Consultant	hunnam@bigpond.com	Setting up a trust fund for SPREP for pacific island states (??).
Kramer, Randy Duke University	Kramer@duke.edu	Environmental policy and management, focusing on improving our understanding of how human and business behavior is shaped by policies intended to protect the environment; currently seconded to IUCN's biodiversity and business program; involved with the Komodo Project.
LaFranchi, Chris Consultant	clafanchi4@cs.com	Economic and financial dimensions of conservation strategies and projects; conservation concessions
Linden, Olof Kalmar University	olof@timmermon.se	Researcher – worked on CORDIO
Merkl, Andreas CCIF	andreas@eaconsulting.com	Initial feasibility for setting up marine concessions in SE Asia; Efficiencies in the marine aquarium fish trade

Morris, Belinda Consultant	belinda@eco-savvy.com	Focuses on increasing capacity to use economic and financial tools for conservation (training and application of analytical tools in a broad setting, integrated with social, cultural, scientific, governance, population and other aspects). Currently supervising a portfolio of pilot initiative to demonstrate the application of these tools within WWF's ecoregion programs
Parks, John IMA	jparks@imarinelife.org	Working at the local level to determine how to appropriate limited financing for maximum benefit (involving locals in MPA management); how to ensure maximum distribution of benefits; how to prioritize where to spend, in collaboration with stakeholders; developing a mutually useful framework for MPA management.
Pet, Jos TNC		Experience from setting up & implementing the Komodo project
Pet-Soede, Lida CCIF/WWF	lidadpet@attglobal.net	Fisheries management consultant – worked with Herman Cesar on economic analyses of blast fishing and coral bleaching; currently setting up CCIF's operation in Indonesia
Pomeroy, Robert IMA		Socio-economic approaches to marine conservation
Power, Mary SPREP	maryp@sprep.org.ws	
Reid, John Conservation Strategy Fund	john@conservation-strategy.org	Mostly involved in training local conservationists to use analytical tools to find smart, efficient solutions to the most urgent environmental problems. Planning a training focused on tropical coral reefs in Southeast Asia and the Pacific (2002/2003)
Riedmiller, Sybille	Chumbe.island@raha.com	Environmental consultant and project director of Chumbe Island Coral Park Ltd. – set up a private management concession on Chumbe Island off Zanzibar.
Rili Djohani TNC	rdjohani@attglobal.net	Experience from setting up & implementing the Komodo project
Ruitenbeek, Jack	hjr@island.net	Economic analysis of natural resource, environmental and human security issues; Adaptive co-management; Was involved in the World Bank Research Committee's research involving cost effectiveness modeling and marine system valuation, focusing on coral reef systems in the tropics
Schuttenberg, Heidi	hzsl@hotmail.com	Socioeconomic aspects of coral – Gap analysis of MPAs in Southeast Asia
Vorhies, Frank IUCN		Financing protected areas – a business approach – investment funds for investing in biodiversity businesses
Westmacott, Susy Consultant	s.westmacott@ncl.ac.uk	
White, Alan Philippines Coastal Program	awhite@mozcom.com	Coral reef MPA management in the Philippines and Asia-Pacific region; application of a certification system and an economic valuation framework for MPA management