Chapter 4.

Sustainable financing of marine protected areas

A frequently cited challenge for more effective management of marine protected areas (MPAs) has been their inability to secure sufficient and sustainable financing. This chapter examines the various financing instruments and approaches that are available, ranging from traditional government budget and donor funding to user fees, taxes and fines, and payments for ecosystem services, among others. The chapter concludes with a discussion on the need to develop finance strategies for MPAs, drawing on examples from different countries.

While the number and coverage of marine protected areas (MPAs) has increased over the last few decades, a frequently cited challenge has been their inability to secure sufficient and sustainable financing. This significantly undermines their ability to achieve their management objectives and MPAs have therefore sometimes been described as "paper parks" (Gelcich et al., 2013; Thur, 2010).[1] For an MPA to be effective, it is important to understand the financing needs associated with their design and implementation (see discussion in Chapter 2 on the costs of MPAs), to identify the possible sources of finance that may be available to support the MPA, and consequently to develop sustainable financing strategies that will be able to mobilise sufficient resources in both the short and longer term.

Financing instruments and approaches

Domestic government budgets and international donor assistance have formed the bulk of protected area financing worldwide (Emerton, Bishop and Thomas, 2006). This holds true when looking only at MPAs as well (Table 4.1). Other sources of finance include user fees, fines, debt swaps, biodiversity prospecting, trust funds and donations. More novel financing sources either underway or being explored include marine payments for ecosystem services (PES), marine biodiversity offsets and blue carbon finance. Each of these is discussed below.

Government budgets

National government funding tends to be the primary source of finance for MPAs in developed countries. In developing countries, government funding also plays a major, albeit perhaps smaller, role, as governments often have more pressing priorities (Thur, 2010). Government budget allocations for MPAs are, however, often insufficient to cover total costs. A 2012 report to the Auditor General of Canada, for example, stated that budget cuts and "insufficient resources" impede Canada's ability to meet its MPA targets (OAGC, 2012). In Australia, in 2002 the Great Barrier Reef Marine Park Authority estimated that actual management costs were approximately twice the budget (Ban et al., 2011). Similarly, the US Papahanamokukea Marine National Monument Management Plan provided funding estimates for desired outcomes, but noted that these estimates are "sometimes substantially above current budget allocations" (Papahanamokukea, 2008). Sabah Parks in Malaysia received 80% (4.2 million Malaysian ringgits) of its funding from the state government to manage four marine parks (Table 4.1), but still reported a 13% (740 000 ringgit) gap between revenues and expenditures in 2009 and a predicted shortfall of 10 million ringgits over the following five years[2] (PE Research, 2010). In the Caribbean, most governments are subject to chronic budgetary shortfalls,[3]

and the most financially secure MPAs do not primarily depend on government grants (Reid-Grant and Bhat, 2009).

Table 4.1. **Financing of marine protected areas: Selected examples**

Marine protected area	Financing sources
Mariana Trench, United States McCrea-Strub et al. (2011)	Government allocations (91%) National non-governmental organisation (NGO) donors (6%) Local NGO donors (3%)
Papahanaumokuakea, United States McCrea-Strub et al. (2011)	Government allocations (95%) National NGO donors (4%) Local NGO donors (1%)
California MPA network, United States (establishment) Gleason et al. (2013)	NGO donors (51%) State government allocations (49%) Over a seven-year process. Does not include staff or in-kind contributions.
4 MPAs, Mexico González-Montagut (2003)	National Commission of Protected Areas (55%) Other public and international sources, civil society, academia, private industry (24%) Protected Areas Fund (12%) European Commission (5%) Entrance fees (3%)
Seaflower, Colombia McCrea-Strub et al. (2011)	Multilateral donors (33%) Regional government allocations (19%) International NGO donors (11%) National voluntary donations (6%) National NGO donors (2%) Bilateral government donations (1%) Government allocations (1%) Local voluntary donations (26%) Local NGO donors (< 1%)
Saba, Netherlands Antilles (establishment) McCrea-Strub et al. (2011)	Government allocations (69%) National NGO donors (21%)
Saba, Netherlands Antilles (operating) Morris (2002)	Entry fees (50%) Souvenir sales (32%) Local voluntary donations, etc. (17%)
Menai Bay, Tanzania Lindhejm (2003)	NGO donors (90%) Government allocations (10%)
Misali, Tanzania Lindhejm (2003)	International donors (NGOs, foreign development agencies, etc.) (84%) Entry fees (15%) Government allocations (1%)
Chumbe Island, Tanzania (establishment) McCrea-Strub et al. (2011)	Private investment (49%) Bilateral government (26%) Bilateral voluntary donations (24%) Multilateral donors (< 1%) International NGO donors (< 1%)
Chumbe Island, Tanzania (operating) Lindhejm (2003)	Tourism entrance fees (90%) International donors (10%)

Table 4.1. **Financing of marine protected areas: Selected examples** (*continued*)

Marine protected area	Financing sources
Mnemba, Tanzania Lindhejm (2003)	Entry fees (85%) Government allocations (15%)
Jozani Chwaka, Tanzania Lindhejm (2003)	International donors (Global Environment Facility, foreign agencies, NGOs) (70%) Entry fees (25%) Government allocations (5%)
Nha Trang Bay, Viet Nam McCrea-Strub et al. (2011)	International donors (52%) Bilateral government donations (38%) Government allocations (6%) Local voluntary donations, etc. (5%)
4 MPAs, Sabah, Malaysia PE Research (2010)	Government allocations (80%) International donors (11%) Fees and charges (8%) Fines (< 2%, no data)
Sugud Islands (SIMCA), Malaysia PE Research (2010)	NGO donors (46%) Entry fees (30%) Concessions (25%)
Pilar, Philippines Butardo-Toribio, Alino and Guiang (2009)	Municipality (59%) Outside grants (37%) Barangay (2%) Community (1%) MPA collections (1%)
Villahermosa, Philippines Butardo-Toribio, Alino and Guiang (2009)	Community (30%) Outside grants (28%) Barangay (27%) Municipality (8%) NGA (Bureau of Agriculture and Fisheries Resources, etc.) (4%) Province (2%) MPA collections (1%)
Bibilik, Philippines Butardo-Toribio, Alino and Guiang (2009)	Municipality (46%) Outside grants (44%) Barangay (5%) Province (3%) NGA (Department of Natural Resources, Coast Guard, etc.) (2%)
Tambunan, Philippines Butardo-Toribio, Alino and Guiang (2009)	Municipality (59%) Outside grants (37%) NGA (Department of Natural Resources, Coast Guard, etc.) (2%) Barangay (1%)
Talisay, Philippines Butardo-Toribio, Alino and Guiang (2009)	Outside grants (59%) Community (36%) Municipality (4%) Barangay (2%)
MISTTA, Philippines Butardo-Toribio, Alino and Guiang (2009)	Municipality (59%) Outside grants (30%) Barangay (8%) NGA (3%)

Table 4.1. **Financing of marine protected areas: Selected examples** (*continued*)

Marine protected area	Financing sources
Port-Cros National Park, France	Government allocations (72.5%) Donations and philanthropy (2.3% Fiscal revenues (Barnier tax[1]) (4%) Self-financing (service delivery sales) (21%)

Note: 1. This tax, created in 1995 ("Barnier Law"), applies to maritime transport passengers when they purchase a ticket to travel across the national park. The tax amounts to 7% of a "one-way" ticket price before tax and cannot amount to more than EUR 1.57. The tax is currently being collected in Port-Cros and Calanques National Parks. For practical reasons, its implementation has been delayed in the Guadeloupe National Park.

Conservation budgets in both developing and developed countries have tended to stagnate or decrease in recent years, especially when the government is under strain (Emerton, Bishop and Thomas, 2006; Thur, 2010; Hunt, 2013). Given the public good characteristics associated with many marine ecosystem service benefits, national government funding should continue to be an important contributor to MPA budgets in both developed and developing countries. Valuation studies and cost-benefit analysis should help to make the case to Ministries of Finance that greater investment in MPAs is needed. However, broader finance portfolios for MPAs should be developed, including revenue-generating instruments that are based on the polluter-pays approach.

Donor funding

Many MPAs in developing countries rely on bilateral and multilateral development assistance for financial support, including from national foreign aid agencies, multilateral banks and agencies such as the Global Environment Facility (GEF) and the World Bank. Additional funding can come from private donors, philanthropic foundations, non-governmental organisations (NGOs) and communities. Donor funding is normally part of a wider portfolio of finance, and tends to support establishment costs, training and other forms of capacity building necessary to set up an MPA, as well as to put frameworks in place for them to become financially self-sufficient. Donor funding is generally not intended to support ongoing, long-term expenses of MPAs (Emerton, Bishop and Thomas, 2006; Erdmann et al., 2003; McClanahan, 1999).

The GEF, for example, contributes about USD 100 million annually to the protection of marine ecosystems (Reid-Grant and Bhat, 2009) and has supported more than 1 000 MPAs worldwide. In Samoa, for example, a GEF grant was used to establish a sequence of multiple district-level MPAs. Revenues from charges and fines were used post-grant to seed a trust fund (WWF, 2005). Funding such as that by the GEF is clearly limited, however,

(donors pledged USD 1.3 billion towards the biodiversity focal area for the GEF-6 replenishment period) and for protected areas is targeted to those areas that are globally significant, based on vulnerability and irreplaceability criterion (GEF, 2014). Philanthropic foundations have also engaged in MPAs, such as Pew's Global Oceans Legacy, including partners such as Bloomberg and the Lyda Hill Foundation.

Trust funds and debt-for-nature swaps

Several MPAs have established trust funds to help ensure a more long-term sustainable, source of finance. Three types of trust funds exist: endowment funds, which maintain a capital base while paying only interest; sinking funds, which use both capital and interest and are thus eventually extinguished; and revolving funds, which are designed to be continuously replenished.

In Belize, a Protected Area Conservation Trust (PACT) was established in 1996, funded principally via a conservation fee on visitors to Belize upon departure and a 20% commission from cruise ship passengers (Drumm et al., 2011). In Mexico, a remnant worth USD 16.5 million from a USD 25 million GEF grant was used to capitalise a Protected Areas Endowment Fund in 1997. This grew to USD 42 million in 2003 following several donations. Interest from the fund, along with federal allocations, entrance fees and an EU grant, was channelled annually to various protected areas, including four marine parks (González-Montagut, 2003). In Mauritania, an endowment fund BACOMAB was established in 2009 to finance the conservation of the Banc d'Arguin and other Mauritanian coastal and marine protected areas. Its capital will be invested for perpetuity on capital markets and only the interest will be used to finance marine and coastal protected areas. The Mauritanian government made an initial contribution to BACOMAB during 2010-11 by mobilising EUR 1.5 million of revenues from the fisheries agreement with the European Union. French Development Agency and French Facility for Global Environment have contributed an additional EUR 2.5 million and EUR 1 million respectively. BACOMAB's funding objective was to reach EUR 35 million by 2016. Other funding sources to be explored include:

- Contributions from the oil and gas sectors through voluntary compensations or fees attached to concessions.
- Fiscal mechanisms such as a share of fines for fishing infractions or of fishing licences; part of tourism-related taxes; environmental fees or licences for industries with possible impacts on marine ecosystems; or a tax on the use of ecosystem services.

- Carbon finance, in particular related to the sequestration of carbon in marine ecosystems such as seagrass beds in the Banc d'Arguin ("blue carbon") (French Facility for Global Environment, 2013).

The Mesoamerican Barrier Reef (MAR) Fund[4] is an example of a pooled fund, with contributions from Belize, Guatemala, Honduras and Mexico. Its central focus is on 14 MPAs in the Mesoamerican Reef ecoregion, which contains the largest barrier reef system in the western Atlantic.

In Kiribati, the government's approach to ensuring the long-term financing of the Phoenix Islands Protected Area (PIPA) is based on the purchase of "reverse fishing licenses" by charitable donors. The goal is to capitalise an endowment fund, at a level that would generate an income stream sufficient to cover the operating and management costs of the trust, and the foregone revenues from fishing associated with the closure or restriction of activities within the PIPA region in Kiribati. The funding target was USD 25 million, with an interim target of USD 13.5 million by 2014, based on 25% of the PIPA area under a no-take-zone. The protected area also receives the support of the "PAS: Phoenix Islands Protected Area (PIPA)" project (GEF: USD 870 200, co-finance: USD 1.7 million) implemented by the United Nations Environment Programme. An endowment fund is also being developed for the Bird's Head Seascape in West Papua.

A Global Conservation Fund (GCF) was also established in 2001 in which about USD 13 million (of a total of USD 65 million) has been invested in important marine regions (Bonham et al., 2014). The GCF was made possible by a grant from the Gordon and Betty Moore Foundation and has leveraged more than USD 200 million.

Debt-for-nature swaps entail the reallocation of a developing country's funds from repayment of debts to natural resource protection. Debt swaps and trust funds have often been used in conjunction. The US government funded the purchase of USD 19 million of Philippine debt in 1992, of which USD 17 million was used to set up the Foundation for the Philippine Environment endowment fund (ADB, 2011). NGOs have also been active in this field. In 2015, The Nature Conservancy (TNC) brokered a USD 31 million swap between the Seychelles, its Paris Club creditors and South Africa to finance marine conservation and climate adaptation, capitalise an endowment fund and repay impact investors over a 20-year timeframe. The marine conservation component includes the creation and management of over 400 000 km^2 of new MPAs (TNC, 2015). Similarly, Jamaica was able to create a trust fund for its national parks through a direct swap with TNC, although the interest is not sufficient for all of its protected areas (Reid-Grant and Bhat, 2009).

User fees

User fees are collected from resource users, including tourists, who chose to access a service or facility. These types of fees are already being applied in a number of MPAs worldwide (Table 4.2) and are set at various levels depending on their purpose (e.g. cost recovery vs. visitor management to reduce congestion and/or ecological damage), type (e.g. general entrance fees, diving/snorkeling or research fees) and the prevailing local socio-economic characteristics of the region (e.g. number of visitors, income levels, price elasticity of demand[5]). Though tourism revenues, for example, can also be unreliable due to the inherently volatile nature of the industry, which fluctuates with the state of the global economy, natural disasters, political turmoil and other considerations (Erdmann et al., 2003; PE Research, 2010), revenues can be sizable.

Indeed, some MPAs have been mostly or entirely financed via user fees. Malaysia's Kota Kinabalu National Park, for example, raises approximately 80% of its operating expenses from user fees (ADB, 2011). The Bonaire Marine Park in the Netherlands Antilles had, as of 2010, self-financed all operations since 1992 through dive entrance fees, boat entrance fees and mooring fees (Forest Trends, 2010; Thur, 2010). A 2005 raise in Bonaire's annual fees to USD 25 and USD 10 for divers and non-divers, respectively, created a revenue stream conservatively estimated at USD 760 000, far higher than the 2002 operating budget of USD 270 000. The surplus was used for the nearby Washington-Slagbaai terrestrial park, which also provides upstream ecological benefits to the marine park (Thur, 2010). In the Philippines, the Gilotongan Marine Reserve appeared to meet all of its funding needs through tourism fees, in fact realising a profit on the order of USD 85 000 in 2012 (MSR, 2012).[6]

Scope may thus exist for wider application of user fees into MPA finance portfolios, though they must be well designed. One challenge cited for expanding the scope of user fees to other marine parks is that there are not always easily defined entry points at which to charge the fee. At the Bunaken Marine Park, a dual fee/ticket system was used which worked effectively in an open access MPA that has no single entry point. The fee is charged per person for an annual waterproof tag. Tags are individually numbered to prevent illegal resale and data from the receipts are entered into a database to help prevent corruption and to gather tourist statistics.

Social acceptability of a fee has been another issue, as there can be a perception that everyone should have access to natural areas free of charge. Visitors generally accept the imposition of entry fees if they are made aware that revenues are intended for MPA management. Raising awareness and ensuring transparency are therefore important (IUCN, 2004; ADB, 2011).

Users should be consulted to determine the level of fee they are willing to pay, sufficient user numbers must exist (ADB, 2011), and the fee should be targeted at the correct tier of visitor, e.g. international vs. domestic tourists, as the former may have a higher ability and willingness to pay. Many MPAs charge domestic residents reduced fees, or no fees at all, including Belize (Hol Chan and Half Moon Caye), Ecuador (Galápagos), Egypt (Ras Mohammed), Kenya, Netherlands Antilles (Saba), Philippines (Tubbataha and Gilutungan), Tanzania, Thailand and the United States (Hanauma Bay).

Revenues that are retained at park level are more effective at generating funding sources. In many cases, revenues collected at MPA sites are largely allocated to central agencies and do not return to the MPA, creating a disincentive for generating new revenues and increasing instability (Emerton and Tessema, 2001; Emerton, Bishop and Thomas, 2006; Reid-Grant and Bhat, 2009). For example, Malindi Marine Park in Kenya could potentially self-generate 20% of its operating costs, but revenue was returned to the Kenya Wildlife Service (IUCN, 2004), and Kisite Marine National Park in Kenya earned revenues from tourism that are more than seven times higher than its operating budget, but still suffered from a lack of sufficient finance as all revenues were centrally retained (Emerton, Bishop and Thomas, 2006). Sabah Parks' four marine parks raised approximately 2.1 million ringgits in 2009 from entrance fees, 39% of total revenues and 35% of total expenditure; however, only 20% was retained at park level, with the rest allocated to the Indonesian government, partly as compensation for security services (PE Research, 2010).

Diving or research fees are generally set higher than regular entrance fees. Divers have paid as much as EUR 120 per day in Mediterranean marine protected areas (Emerton, Bishop and Thomas, 2006). Zanzibar's Misali Island Conservation Area charged staggered entry rates of USD 5 per day for internationals, USD 20 for large boats, USD 200 for filming and USD 50 per week for research (Lindhjem, 2003). Cousin Island Special Reserve in the Seychelles also covered its 2002 operating costs of USD 209 520 through visitor revenue totalling USD 279 860; collected from daily fees of USD 25, USD 300 and USD 450 for foreign tourists, photographers and film crews respectively; and USD 800 per quarter for research crews (WWF, 2005).

Some fee increases have caused divers to move to equivalent sites outside the MPA, resulting in decreased funding to the management authority (IUCN, 2004), while others have caused visitor numbers to increase, as divers seek well-managed areas (van Beukering et al., 2006) (Table 4.2).

For MPAs in Chile, revenues from tourism are not sufficient to finance running costs and enforcement. For example, Lafken Mapu Lahual, one of the largest multiple-use MPAs in continental Chile, could only achieve

around 10% of running costs, in the most favorable conditions, under current management scenarios (Gelcich et al., 2013).

Other types of user fees also exist. Where fishing is allowed in MPA boundaries, revenue generated from license fees can be used to fund MPA management activities. In cases where licenses are not accompanied by entry limits, the fees can be set higher to appropriately capture economic rents (ADB, 2011). Berau Marine Conservation Area in Indonesia charges one-year fishing permits ranging from IDR 10 000 to IDR 109 500 for local boats, and USD 54-247 for foreign boats, depending on tonnage and the type of boat; other taxes from the fisheries sector amounted to IDR 112 million in 2006 (MSR, 2010). In Israel, for example, a marine environmental protection fee is levied on ships calling at Israeli ports and oil unloading platforms. This fee varies according to the size of the ship and the amount of oil, with the revenues going to the Marine Pollution Prevention Fund (OECD, 2011).

Table 4.2. **Examples of marine protected area user fees**

Site	Fee	Notes	Reduced visitation
State marine protected areas, Australia	USD 2/day, max USD 6	Opposition by tourism industry due to lack of notification	Yes, at local use sites in Tasmania
Abrolhos & Fernando de Noronha, Brazil	USD 4.25/day	Retained by environmental agency; 50% to parks	No
Ras Mohammed, Egypt	USD 5 (foreigners) USD 1.20 (locals)		No
Red Sea, Egypt	USD 2/day (diving, snorkelling)	Initial fee USD 5, lobbying reduced to USD 2	Yes, caused shift to nearby non-fee areas
Bunaken, Indonesia	USD 0.20/day (locals) USD 5/day (foreigners) USD 17/year (foreigners)	80% park, 10% each local/national governments	No
Koror State, Palau	USD 15/fortnight (diving)	Raises USD 1million/year, enough for all costs	
Soufriere, St. Lucia	USD 4/day, USD 12/year (diving) USD 1/day (snorkelling)	Support has increased	No, numbers increased

Source: Adapted from Van Beukering, P. et al. (2006), "The economic value of the coral reefs of Saipan, Commonwealth of the Northern Mariana Islands".

Mooring buoy fees are another potential source of revenue (WWF, 2005). Reid-Grant and Bhat (2009) suggest that the Montego Bay Marine Park in Jamaica could realise significant savings by passing through the costs of deployment and maintenance of mooring buoys to hoteliers and other individuals that use the buoys.

Taxes and fines

Taxes and fines are another means of raising finance for MPAs. Taxes have been defined as compulsory unrequited payments to general government[7] (OECD, 2009), though revenues from taxes can also be earmarked. Belize, for example, charges all departing visitors a USD 3.75 fee and takes a 20% commission on all cruise ship passenger fees, both of which are applied to the Protected Areas Conservation Trust (PACT, 2010). Recreational operations such as cruise ships, tourism and local industries are logical initial targets. In 2001, Switzerland's Hotelplan group established a EUR 3 fee for patrons of their Mediterranean tourism packages to support cetacean and seaturtle conservation projects in the region (Emerton, Bishop and Thomas, 2006), and the US Dingell-Johnson Sport Fish Restoration Program charges excise taxes on a variety of fishing equipment (10% on fishing supplies; 3% on electric outboard motors; and an additional tax on small boat fuel) to fund sport fishery projects throughout the nation (TNC, 2012). Such taxes can also be partially earmarked to MPAs if appropriate. In France, the 1995 Barnier Act has set up a tax on maritime passenger ships that are destined to natural protected areas, and revenue is earmarked for these areas.

In response to declining salmon stocks, Iceland implemented levies on both rod and commercial salmon fishing licenses in 2006. Revenue (USD 16.6 million in 2008) is invested in wild salmon management programmes for stock and habitat improvement (WWF, 2009). In Alaska, salmon fishermen in some areas have voted to institute a 2% or 3% tax on themselves through the state budget to fund stock enhancement programmes. Proceeds are returned to regional aquaculture associations, incorporated as private non-profits, which operate hatcheries for stock supplementation (Knapp, Roheim and Anderson, 2007). Where MPAs are expected to create spillover effects or to improve the health of fish stocks, this approach could be replicated, with tax revenues being directed to MPA management.

MPAs with nearby boat traffic may also generate revenue by collecting fines from ships violating restrictions by, for example, running aground on reefs (MSR, 2012) or fishing illegally. Apo Reef Natural Park in the Philippines collects fines from apprehended fishing vessels, which are deposited into the Integrated Protected Areas Fund, though their contributions to MPA management costs have not been quantified.

Subsidies

MPAs often enhance fisheries by either explicitly protecting fish stocks or the biodiversity that stocks depend on, resulting in increased fish yields, increased sustainability of extractive activities and increased recreational quality (Cook and Heinen, 2005). For example, average annual fisheries benefits of the two largest MPAs in the Seychelles were estimated to be

approximately USD 200 000 each (Cesar et al., 2004).[8] MPA costs can thus be considered a subsidy to fisheries (Cullis-Suzuki and Pauly, 2010). Financial support could be diverted from direct fisheries subsidies to MPAs under this assumption, including by converting jobs from the fisheries sector to MPA management. This would also aid in reducing financial stress in the fishing community (Gell and Roberts, 2003), thereby increasing political acceptability.

However, many of the subsidies received by fisheries may also be environmentally harmful, such as non-taxation of transport fuels. This leads to less efficient fishing methods and operations. In OECD countries, the fisheries sector has received approximately USD 6.4 billion a year in transfers from the government (OECD, 2006). The majority of this support is for management services, R&D and infrastructure, the effect of which is ambiguous, but it also includes support to inputs such as for bait, gear and fuel which can be environmentally harmful when they lead to increases in fishing effort due to lower marginal costs (Van Winkle et al., 2015; Borello et al., 2013).

A tax credit system can also be developed, in which private entities' payments towards conservation can be claimed against their tax payments (ADB, 2011).

Payments for ecosystem services, including blue carbon

Payments for ecosystems[9] (PES) programmes in the context of marine and coastal ecosystems are also being introduced. Based on the beneficiary-pays approach, those who would benefit from the enhanced provision of ecosystem services (i.e. above that of the status quo) can pay resource owners or managers to change their management practices so as to incentivise higher (or additional) ecosystem service provision.[10] Some particular challenges may arise in the context of applying PES in the marine environment: marine resources, particularly fish, are mobile and hard to monitor, and property rights are often poorly defined and insecure, increasing the difficulty of programme uptake (IIED, 2012). As PES programmes are based on the beneficiary-pays approach (rather than polluter pays), they may be more appropriate when the existing resource users are poorer population groups.

Potential buyers may include the fishing, tourism, recreation and marine renewable energy industries; municipalities and governments; and so forth (Lau, 2013; IIED, 2012; Forest Trends, 2010). For example, local hotels and tourism operators could pay for reef conservation due to the benefits associated with decreased beach erosion and species conservation (e.g. for scuba divers). Castano-Isaza et al. (2015) examine PES options for Colombia's Sunflower MPA, the largest MPA in the Caribbean. PES has

been used for seaturtle conservation efforts in Kenya, Tanzania and the Solomon Islands (Ferraro, 2007) and more recently, Binet et al. (2013) conclude that the European Union-Mauritania fisheries agreement, which allocates part of Europe's financial contribution to the conservation of marine ecosystems located within the Banc d'Arguin National Park, can be regarded as the first international PES of its kind.

PES programmes also show potential for involving local communities. The Luis Echeverria community in Mexico is protecting about 48.5 km^2 of grey whale habitat in exchange for USD 25 000, used to finance small-scale development and alternative income generation (IIED, 2012), and the government of Seychelles, with co-funding from the GEF, instituted a buyout and retraining programme for tortoiseshell artisans prior to banning commercial sales (Lau, 2013). Tanzania's Marine Legacy Fund derives revenues from commercial fishing licences, marine ecotourism revenue sharing, and oil and gas taxation that is used to pay coastal communities for conservation and to finance some operational expenses (Forest Trends, 2010).

Marine and coastal ecosystems also have climate mitigation potential. Coastal ecosystems such as salt marshes, seagrass beds and mangroves all store sizable amounts of carbon, creating potential for usage with UNFCCC mechanisms under developing "blue carbon" programmes. This would constitute an international PES and could be useful for MPA financing in cases where MPAs include coastal zones. Loss by conversion from marshes, mangroves and seagrasses can imply a release of 0.15-1.02 billion tonnes of carbon dioxide (Lavery et al., 2013). Mangroves and seagrasses support fish habitats and increase fish production, stabilise shorelines, filter land-based pollution, and influence and shelter the fish populations of nearby reefs, and reefs in turn act as wave and current breakers and erosion protectors for coastal ecosystems. In Kenya, for example, the Mikoko Pamoja community-based mangrove conservation project has been certified for entry into the voluntary carbon market, and it is expected that one-third of funds generated – about USD 4 000 – will be used for mangrove conservation (AGEDI, 2014).

Studies are also beginning to investigate the carbon sequestration capacity of marine species (Lutz and Martin, 2014). Sea otters, predators of sea urchins which are grazers, therefore maintain and increase the health and carbon storage capacity of seagrass and kelp beds; marine vertebrates, especially large ones, stimulate phytoplankton production, fish productivity and carbon uptake; and food chain processes transport carbon away from the surface of the ocean. The carbon service value of sea otter influence on kelp beds has been estimated at USD 205-408 million (one-time payment), or USD 16-33 million (one-time payment invested at 8% return) (Wilmers et

al., 2012), while that of marine life in the high seas has been estimated at USD 148 billion (Lutz and Martin, 2014; Rogers et al., 2014).

Marine bioprospecting

The biological diversity of reefs and of marine environments may provide opportunities for collecting marine bioprospecting fees, especially under the Convention on Biological Diversity's Nagoya Protocol on Access to Genetic Resources. In 1992, the US National Cancer Institute paid the Coral Reef Foundation USD 2.9 million for reef samples to be used in cancer research (Spurgeon and Aylward, 1992). Costa Rica's National Biodiversity Institute (INBio) is permitted to undertake bioprospecting in protected areas in collaboration with academia and private enterprise, with the stipulation that 10% of research budgets and 50% of any future royalties be donated to the Ministry for Conservation. In 2006, INBio entered into an agreement to be paid USD 6 000 per year by a biotech company for two natural resource-based materials, one of which was a protein derived from a marine organism (WWF, 2009). Similarly, a USD 30 000 agreement between a pharmaceutical company and Fiji's Verata District helped to sustain marine conservation work in the area (WWF, 2005).

Marine biodiversity offsets

Coastal development, such as urban expansion, port development to support exporting industries and the development of seabed mining, can adversely impact biodiversity and habitats. Biodiversity offsets in the marine context could be explored in such cases. Based on the polluter-pays approach, any excess damage caused after the application of the mitigation hierarchy would need to be compensated by restoration elsewhere. Such restoration efforts could be targeted to areas where new MPAs need to be developed. An example of an offset programme applied in the coastal context can be found in the Australian province of Queensland that instituted a fish habitat offsetting policy in 2002 (Queensland Government, 2002).[11] Other examples exist often involving coastal habitats such as eelgrass and intertidal reefs (Dickie et al., 2013), and a voluntary blue carbon offset programme, called SeaGrass Grow, has been established by the Ocean Foundation in the United States to restore seagrass meadows, which are among the most effective natural ecosystems for sequestering carbon.

Dickie et al. (2013) and Dickie (2014) suggest further applications, for example allowing marine development such as a pipeline or cable to be placed in a sensitive area to avoid an expensive re-routing, and compensating any residual damage by recreating habitat several times greater than that damaged for a much lower cost. Marine renewable energy installations, such as for tidal and wave generation, may also be appropriate

candidates for offsets, especially as attention to the ocean's potential for renewable energy generation continues to increase. Similarly, offsets could be applied to oil and gas drilling and exploration, or to deep seabed mining, and sections of coral reefs expected to be damaged by development could be removed, stored and then transplanted to protected areas, or funding could be directly allocated to reef restoration.

Belize has recently produced a framework for marine and coastal offsets (Belize Coastal Zone Management Authority & Institute and Australia-Caribbean Coral Reef Collaboration, 2014).

Private sector partnerships

Partnerships with the private sector may take several forms, ranging from direct corporate social responsibility-based investments to collaborations between private entities and NGOs or protected area management bodies, although it should be noted that the private sector may not always offer long-term funding (Erdmann et al., 2003).

In the Philippines, a corporation partnered with an NGO to fund parts of a management programme for the Verde Island Passage MPA network (ADB, 2011), while in Indonesia, Misool Eco Resort established and maintains a 1 220 km^2 MPA, including two separate no-take areas totaling 828 km^2, through tourism revenue, institutional donors, and partnerships with local communities and other industries (Misool Baseftin, n.d.; Forest Trends, 2010).

MPAs can also earn revenues by charging concession fees for the sole right to operate inside their boundaries, thereby delegating some aspects of management to the private sector or NGOs. Alternatively, private sector entities with an economic interest in preserving the MPA – e.g. tour operators depending on MPA quality – may consider cost-sharing arrangements with the publicly funded MPA management body. These approaches can aid in day-to-day operations by providing patrol and monitoring assistance, maintenance, or other day-to-day duties that can be completed at lower cost by tour operators, in return for service improvements or concessions from the management body (Emerton and Tessema, 2001).

To ensure transparency and long-term security, public-private partnerships may formalise their legal and financial agreements, such as was done in California for the Marine Life Protection Initiative through a binding agreement and a jointly managed endowment fund (Living Oceans Society, 2012). Private operators have also become involved in the management of the Great Barrier Reef MPA through a variety of mechanisms: resorts provide rangers, commercial fishers pay mooring fees, dive operators monitor illegal fishing, and so forth (CFA, 2003). The Great Barrier Reef Marine Park Authority administers the Eye on the Reef

monitoring and stewardship programme in collaboration with scientists, tourism operators, park rangers and other users (Great Barrier Reef Marine Park Authority, 2014), and tourism operators are building their capacity to undertake starfish management through diver training, in conjunction with the Australian government's Reef Trust Program (Government of Australia, 2014). Similarly, protection for the Jardines de la Reina national park in Cuba was supported by a public-private venture between the government of Cuba and a private company operating a catch-and-release fishing camp, whose best interest was to ensure the area remained pristine (Morris, 2002).

Several similar agreements exist in the Sulu-Sulawesi Seas Marine Ecoregion. The Gilutongan Marine Sanctuary in the Philippines entered into an agreement with a private firm in 2007 to market and manage the sanctuary's 20-metre buffer zone, in which the local municipality was entitled to receive a total of 18 million Philippine pesos over three years. The agreement was renewed in 2011, and was still in place as of 2012 (MSR, 2012). In Malaysia, the Sabah Wildlife Department has outsourced the management of an MPA to a private company, in which the firm pays the state 60 000 ringgits per year and is required to invest in conservation and protection, in exchange for tourism rights (PE Research, 2010). Lastly, in Indonesia, the North Sulawesi Watersports Association provides in-kind support to the Bunaken Marine National Park. Dive operators have sponsored a range of programmes aiding park management, including education scholarships for locals, handicraft sales that create extra sources of income and conservation education activities. Operators also regularly participate in beach and reef cleanups, fish monitoring, enforcement activities and other management operations, resulting in significant savings for the management authority (Erdmann et al., 2003).

In some cases, the private sector may be able to drive the creation of new MPAs (Box 4.1).

Engaging industries such as oil and gas, or others aiming to meet corporate social responsibility requirements, is another option for sourcing funding for MPAs (MSR, 2012; PE Research, 2010). For example, in 2008 the Malaysian infrastructure conglomerate YTL Corporation Berhad donated more than MYR 700 000 (Malaysian ringgits) raised from a climate change fundraising event to Reef Check Malaysia, a reef monitoring non-profit. In 2010, it launched a fellowship of USD 2 million to be donated from 2010 to 2014 for community-based conservation programmes in Asia. In its first year, it identified 22 outreach campaigns in the Coral Triangle to be conducted by YTL fellows (YTL Community, 2010).

Developing a finance strategy for marine protected areas

Given the severe finance shortage across many MPAs, greater efforts are needed to secure the resources that are required to ensure effective MPA management. Developing an MPA financing strategy can help to identify needs and structure the required steps to do this. At a minimum, an MPA finance strategy should be composed of:

Box 4.1. **Chumbe Island Coral Park, Zanzibar**

Chumbe Island Coral Park, comprised of a 22-hectare coral island and part of a fringing reef, was gazetted by the government of Zanzibar in 1994 as a protected area following an investment proposal by a private entity, Chumbe Island Coral Park Ltd. (CHICOP), which was allocated management rights. Establishment costs were initially estimated at USD 200 000, with payback expected to begin after three years at an internal rate of return of 27%, but a three-year delay and unexpected administrative difficulties caused cost overruns which resulted in a final establishment outlay of USD 1.2 million, in addition to a significant amount of volunteer work. Approximately 36% of this outlay was funded by various donors, with the rest funded privately by the project initiator. CHICOP developed eco-tourism facilities which as of 2006 were sufficient to cover recurrent management costs – but not capital payback – at an occupancy rate of 30-40%.

CHICOP has pursued unconventional approaches for operational and business development goals. Local fishers were retrained as park rangers, and in addition to patrolling the island, have rescued over 160 vessels with between 2-16 fishermen each since 1994, likely saving several lives. As private employees, rangers are unarmed, and "enforce by informing" local fishers on the value of the protected area. Spillover catches have indeed been reported, enhancing local support for the park. Today, Chumbe Island is one of the most biodiverse reefs in the region.

With respect to business development, as a small company, traditional marketing costs to leverage the tourism market would have been prohibitive. Instead, CHICOP applied for and won several international environmental awards, providing marketing exposure equivalent to USD 10 million.

CHICOP's example provides insight into some enabling conditions that aid in effectively engaging the private sector, including the existence of an attractive investment climate and little competition from large, donor-funded projects. Furthermore, tourism, fishing and other uses often coexist in the same area, resulting in a need to negotiate, and CHICOP's small, local nature may have afforded it an advantage over a central authority in this regard, due to co-dependencies between it and the local communities.

Sources: Emerton, L., J. Bishop and L. Thomas (2006), "Sustainable financing of protected areas: A global review of challenges and options" https://cmsdata.iucn.org/downloads/emerton_et_al_2006.pdf; Lindhjem, H. (2003), "Sustainable financing of marine protected areas in Zanzibar", www.lindhjem.info/FinanceZan.pdf; Riedmiller, S. (2003), "Private sector investment in marine protected areas: Experience of the Chumbe Island Coral Park in Zanzibar/Tanzania".

1. an assessment of financing needs (see Chapter 2)
2. identification of stakeholders, including the polluters and the beneficiaries (and at what scale – local/regional/global)
3. assessment of different finance sources available for MPAs (see above), and which offer the greatest potential and long-term source of revenue, given the socio-economic and other characteristics in the area
4. assessment of barriers to implementation and procedures for operationalisation.

According to the French National Strategy for the Creation and Management of Marine Protected Areas, the estimated annual costs for an MPA network covering 20% of French waters will amount to around EUR 170 million by 2020 (Table 4.3). Based on current financing principles for MPAs in France, the majority of this will be financed by the government.

Table 4.3. **Estimated cost of the marine protected area network in French waters**

	Estimated annual cost for the marine protected area network (20% by 2020) million EUR
Surveillance (monitoring and control)	70.3
Studies, expert assessment	37.6
Interventions	36.3
Awareness raising	25.8
Total	170

Source: French Ministry of Ecology, Sustainable Development and Energy (2015), "National Strategy for the Creation and Management of Marine Protected Areas: Summary", www2.developpement-durable.gouv.fr/IMG/pdf/National_strategy_for_the_creation_and_management_GB_Web.pdf.

The identification of the polluters (i.e. those causing adverse impacts to the existing or proposed MPA) can help to determine whether mechanisms are in place to internalise the externalities and whether there is additional scope for additional taxes and fines to help address these. Part of the revenues obtained from such instruments could be earmarked for MPA management. The beneficiaries of MPAs can include a larger number of stakeholders including up to the global level. Examples include international tourism benefits from biodiversity conservation, habitat for endangered and migratory species, replenishing fish stock for commercial fisheries, carbon sequestration and mitigation of natural disasters and impacts related to

climate change. User fees and international payments for ecosystem services can be considered as additional means to mobilise finance for MPAs.

Despite the finance challenge for MPAs, few examples exist of MPA finance strategies. A few exceptions include a financing scoping exercise in the Sulu-Sulawesi Seas Marine Ecoregion, Indonesia (MSR, 2010) and a finance strategy and plan in Belize (Box 4.2).

Box 4.2. **Sustainable finance strategy and plan for the Belize Protected Area System**

A study was undertaken in 2011 for the government of Belize to help develop a finance strategy for the national protected area system. This consisted of the following components:

- financial analysis – needs and gaps
- review of existing financial mechanisms (e.g. PACT, government budget, development aid, debt for nature swaps)
- market analysis of revenue-generating options
- enabling conditions (e.g. legal, institutional, barriers)
- pre-feasibility of revenue-generating options
- scenario analysis (projections for revenue and expenditures)
- financial plan/strategy (including recommendations and timeline).

Source: Drumm, M.E. et al. (2011), "Sustainable finance strategy and plan for the Belize Protected Area System".

In a recent financial analysis of Mediterranean MPAs (Binet et al., 2015; see also above), where only 8% of the financing needs for effective management of MPAs are covered by current resources, the authors recommend that additional financing needs could be partly covered by local mechanisms, including local public support; and that additional financing mechanisms should be developed, such as entrance and users fees, earmarking of charges collectable under the occupation of public land, among others. They also recommend strengthening regional co-operation to achieve more complementary and joint management, optimising the consumption of resources.

Spergel and Moye (2004) have developed a list of feasibility criteria for the finance mechanisms (Box 4.3).

The IUCN-WCPA (2008) suggests several main components of sustainable financing strategies: sharing responsibilities with stakeholders to build support and ownership; building diverse funding portfolios; improving financial administration; comprehensively addressing all costs and benefits; instituting transparent governance; creating an enabling framework by overcoming market, price and policy distortions; and building capacity to use financial tools and mechanisms.

Box 4.3. **Feasibility criteria for the financing mechanism**

Financial

- How much money will actually be needed each year to support the particular marine conservation programmes and activities that are envisaged?
- How much revenue is likely to be generated each year by the new financing mechanisms?
- Will the revenues generated be worth the cost of setting up the new system of user fees, taxes, debt-for-nature swaps or trust funds?
- Could the revenues vary substantially from year to year depending on global and national economic, political and natural conditions?
- How will a highly variable revenue flow affect the conservation programmes that the financial mechanism is intended to pay for?
- What other sources of funds might be available, either on a long-term or a one-time basis?

Legal

- Can the proposed financing mechanisms be established under the country's current legal system? Some legal systems do not recognise concepts such as easements or development rights. In other legal systems, there may be a constitutional prohibition against earmarking tax revenues or fees for specific purposes.
- Will new legislation be required in order to establish the proposed financing mechanism?
- How difficult and time-consuming will it be to pass such legislation?
- Could the new financing mechanism be established under current legislation, by simply issuing an administrative or executive order?

Box 4.3. **Feasibility criteria for the financing mechanism** (*continued*)

Administrative

- In the particular country, how difficult will it be to administer, enforce, collect or implement a particular type of user fee, tax, or quota and trading system?
- Will it be too complicated or costly to administer?
- Are there enough trained people (or how difficult will it be to train enough people) to administer and enforce the system?
- Will implementing the particular user fee, tax or quota depend too much on the discretion of individual officials and therefore present too many opportunities for corruption?
- Can safeguards be devised to limit potential problems?
- How difficult will it be to collect, verify and maintain the data upon which a particular user fee, tax or trading system is based? For example, how difficult will it be to keep track of the amount of fish that are caught each day or each month by particular individuals, communities or commercial fishing vessels; or the number of people who visit a marine protected area (MPA), or who use particular products or ecological services provided by the MPA?

Social

- What will be the social impacts of implementing a particular system of generating revenues for conservation?
- Who will pay, and what is their willingness and capacity to pay?
- Will the new financing mechanism be perceived as equitable and legitimate?

Political

- Is there government support for introducing the new financing mechanism?
- Can the government be relied upon to spend the new revenues only for the purposes intended, or is there a strong likelihood that the money may end up being used for other purposes?
- Can this be monitored and ensured by the courts or the media or non-governmental organisation "watch-dog" groups or particular user groups or an independent board of directors or an international agency?

Box 4.3. **Feasibility criteria for the financing mechanism** (*continued*)

Environmental

- What will be the environmental impact of implementing the new financing mechanism? For example, for tourism-based mechanisms will the desire to increase revenues from tourism compromise conservation objectives or exceed the carrying capacity of the MPA?

Source: Spergel, B. and M. Moye (2004), *Financing Marine Conservation: A Menu of Options*, http://awsassets.panda.org/downloads/fmcnewfinal.pdf.

Table 4.4. **Financing marine conservation and sustainable use**

Financing mechanism (source of revenue)
Government revenue allocations
Direct allocations from government budgets (government budget revenues)
Government bonds and taxes earmarked for conservation (investors, taxpayers)
Lottery revenues (gamblers)
Premium-priced motor vehicle license plates (vehicle owners)
Wildlife stamps (postal customers, hunters, fishers)
Debt relief (donors, government, non-governmental organisations)
Grants and donations
Bilateral and multilateral donors (donor agencies)
Foundations (individuals, corporations)
Non-governmental organisations (NGO members and supporters)
Private sector (investors)
Conservation trust funds (multi-source)
Tourism revenues
Protected area entry fees (visitors to parks)
Diving and yachting fees (divers, boaters)
Tourism-related operations of protected area (agencies, tourism operators, tourists)
Airport passenger fees and cruise ship fees, taxes and fines (tourists, cruise lines)
Hotel taxes (hotel clients)
Voluntary contributions by tourists and tourism operators (tourism operators, tourists)
Real estate and development rights
Purchases or donations of land and/or underwater property (property owners, donors)
Conservation easements (property owners, donors)
Real estate tax surcharges for conservation (property owners, donors)
Tradable development rights and wetland banking (property developers)
Conservation concessions (conservation investors)

Table 4.4. **Financing marine conservation and sustainable use** (*continued*)

Fishing industry revenues
Tradable fishing quotas (commercial fishers)
Fish catch and services levies (commercial fishers)
Eco-labelling and product certification (seafood producers, wholesalers, retailers and end-use purchasers of ornamental tropical fish and corals)
Fishing access payments (governments, associations of and/or individual fishers)
Recreational fishing license fees and excise taxes (recreational fishers)
Fines for illegal fishing (fishers)
Energy and mining revenues
Oil spill fines and funds (energy companies, donors)
Royalties and fees from offshore mining and oil and gas (energy and mining companies)
Right-of-way fees for oil and gas pipelines and telecommunications infrastructure (private companies)
Hydroelectric power revenues (power producers)
Voluntary contributions by energy companies (energy companies)
For-profit investments linked to marine conservation
Private sector investments promoting biodiversity conservation (private investors)
Biodiversity prospecting (pharmaceutical companies)

Source: Spergel, B. and M. Moye (2004), *Financing Marine Conservation: A Menu of Options*, http://awsassets.panda.org/downloads/fmcnewfinal.pdf.

Notes

1. For example, in a study of 83 MPAs worldwide, Balmford et al. (2004) found that, on average, the funding shortfall was approximately one-half of requirements (median value of USD 2 698 per km² per year). A similar study by Gravestock, Roberts and Bailey (2008) on the financing requirements of 79 MPAs in 36 countries found that a median of 15% and 74% funding increases were required to meet minimum and ideal requirements, respectively.

2. This was partly because the parks were unable to retain a large enough proportion of revenues raised from user fees.

3. Government allocations to the Montego Bay Marine Park in Jamaica, for example, decreased from JMD 1.2 million in 1998 to less than JMD 100 000 in 2004.

4. www.marfund.org.

5. When price elasticity of demand is relatively inelastic, the percentage change in quantity demanded is smaller than that in price. Hence when the price is raised, total revenue increases. The opposite holds when price elasticity of demand is relatively elastic. Pascoe et al. (2014), for example, estimate the price elasticity of demand for dive tourism in Indonesia, Malaysia and Thailand and find this to be highly inelastic.
6. Though the authors caution that this is atypical, and that hidden and unaccounted costs may have existed.
7. They are unrequited in the sense that benefits provided by the government to taxpayers are not normally in proportion to payments.
8. Assuming high reef productivity and spillover; assuming one hectare of reef closure provides equivalent yield to three open hectares.
9. As noted earlier, France uses the term payments for environmental services to make a distinction between when payments for services should be warranted (i.e. when changes in management practices result in additional services). Additionality should in fact be a pre-requisite for any payment; see OECD (2010) for a discussion.
10. For a detailed discussion of key features that need to be considered in designing a PES programme, including establishing baselines, ensuring additionality, addressing potential leakage and ensuring permanence, see OECD (2010).
11. Absorbed into the Queensland Environmental Offsets Policy of 2014.

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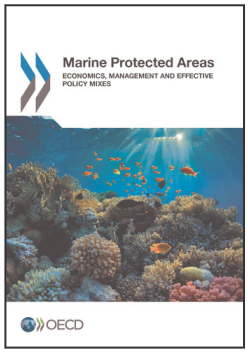

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