

# Significant Social and Economic Aspects of Biodiversity Conservation

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**Opposite page:** Community-based mangrove plantation with children as “no trespassing” guards, Ulo village in north Mozambique. © José Paula.

## INTRODUCTION

Current practices on coastal and marine resource management in the Western Indian Ocean (WIO) have integrated multiple but interrelated economic and social aspects that impinge on the state of the environment. This is a reflection of changing perceptions on human-environment interactions, and deeper appreciation of the significance and complexities of the human dimension in biodiversity conservation (Cinner and David 2011, Rocliffe and others, 2014). Conceptually, some conservation initiatives have woven together the realities of societal processes, particularly demographic dynamics, people’s livelihoods and cultural value systems, with ideas on and estimations of the economic of environmental resources together with their habitats (Sultan 2012, Turpie and Wilson 2011). This understanding is used to influence policy and practice in the management of resources. Also important are policy choices and commitments to management, indicating how global processes or national priorities influence decisions on conservation practice (UNEP 2013) and the adaptation of coastal communities to climate change. Increasingly, economic and social effects of climate change, witnessed by sea level rises or temperature surges in the region, are becoming key components in biodiversity conservation (UNEP 2011), especially with regard to human activities as non-climate stressors (Westerman and Gardner 2013). These effects have been taken into consideration in ecosystem-based management approaches in which the iterative relations between people,

nature and institutions inform resource management and conservation projects (Grillo 2011). Community participation is regarded as particularly important in the management of these resources for their effective biodiversity conservation.

A major concern in the region, however, is the nature of human interactions with resources and the differential distribution of costs and benefits among various groups and actions brought about by existing resource governance structures, power relations and interests (Kulindwa and Lokina 2013). The Convention for Biological Diversity (CBD) showed in its Global Biodiversity Outlook 3 that terrestrial and marine biodiversity was declining globally at an alarming rate (CBD 2010). In the WIO, some of the social dimensions of biodiversity loss were identified, including inconsistent government policies, failure to enforce environmental laws, centralization of decision-making on resource management and undue political influence and misguidance (Wood and others, 2000, Kulindwa and others, 2001). Several outcomes can be considered. One is how the political and social contexts have affected biodiversity conservation and vice versa. It is also important to consider the nature of the economic and social costs generated by rules and regulations on resource use. In addition, there are issues concerning trade-offs arising from policy decisions between conservation and the economic benefits driven from resource use. This chapter describes key social and economic aspects of biodiversity conservation in the WIO and management responses that would be meaningful in influencing policy on

biodiversity conservation in the region.

### THE SOCIAL CONTEXT OF CONSERVATION

Poverty and the level of dependence on coastal and marine resources are among the key factors that influence the effectiveness of biodiversity conservation. The diversified livelihood patterns of coastal communities are hampered by factors such as declining resource bases, competition, poor resource extraction methods and others. As a result, the viability of many of these activities to sustain households is leading to overexploitation of the most accessible resources (Salagrama 2006, Tobey and Torrel 2006, UNEP 2006). Rapid population growth is an intervening variable and, as illustrated in Chapter 1, population densities are increasing at a rapid rate in the coastal zone of the WIO region (World Bank 2012, UNEP 2011). It is estimated that over 60 per cent of the total population of Sub-Saharan African coastal states live within 100 km of the coast and derive their livelihood from the coastal and marine environment. Heightened competition for resources, which has been influenced by societal dynamics and neoliberal economic policies, has increased the rate of exploitation of resources, thereby challenging management effectiveness. For example, intensification in coastal infrastructural development (see Chapter 29) and economic investment along the coast, magnified recently by the oil and gas industry (see Chapter 26), are impinging on both fragile ecosystems and human livelihood sources (UNEP 2012).

A larger social issue concerns institutional challenges. Management institutions are unable to address compliance, while low skills and technological development in the region, which may otherwise permit improve public attitudes towards conservation, is inadequate. These social aspects are discussed in the rest of this chapter.

### TRADITIONAL MANAGEMENT REGIMES

Customary tenure over resources is becoming increasingly unpopular and this has affected people's perceptions on how resources should be managed and, therefore, also how it benefits people and the environment (see Chapter 20). There are nevertheless several examples of coastal communities in the region who have upheld resource use regulations informed by their sense of attachment to a resource base (Cinner and Aswani 2007). Such communities still realise that their existence, indeed

their survival and continuation as a people, is dependent upon the said resources or ecosystem. In some, fisherfolk describe their rights to marine commons as akin to communal ownership derived from their ancestors or a spiritual being. Through these rights, they ascribe access, ownership and use of resources, based on membership of the local community (Sunde and Isaacs 2008). These rights also entail management obligations as illustrated by the practice of the Vezo people in Madagascar (Harris 2007) provided in Box 11.1.

Velondriake illustrates how cultures can be used to reinforce or sanctify institutions established for resource conservation, and how participatory conservation processes can serve to reinvigorate local customs, becoming instrumental in maintaining biodiversity. Unfortunately, similar initiatives to those of the Vezo have been eroded due to factors that include societal dynamism in the WIO, population growth, materialism and the proliferation of new value systems regarding resources (Cinner and Aswani 2007, Masalu and others, 2010). This has made their contribution to the sustainable use and conservation of coastal and marine resources questionable, and difficult to integrate into legalised conventional management practice (Sunde and Isaacs 2008). At the same time, inadequate governance arrangements have trivialised traditional management systems and have created discontent, including non-compliance with resource protection (Cinner and others, in press). In areas where the formal integration of traditional or customary systems of governance into national environmental management policies has been possible (eg Madagascar, South Africa), it has permitted local communities to sustain their livelihoods according to a more culturally-sensitive process, which is also beneficial to the resource base (Sunde and Isaacs 2008, Westerman and Gardner 2013).

### VALUATION OF RESOURCES AND BENEFITS TO BIODIVERSITY

Valuation of ecosystem services (provisioning, regulating, supporting and cultural) is not straightforward because of limited understanding of the full range of ecosystem functions (Bullock and others, 2008). However, economic estimation of resource use employing the Total Economic Value (TEV) approach (ie economic valuation of direct, indirect, option and non-use values of resources and ecosystems) is currently an integrated aspect of resource management in the region (UNEP 2006, Sultan 2012, Turpie

**BOX 11.1.****TO LIVE WITH THE SEA – THE VEZO PEOPLE, MADAGASCAR**

The sails show the Vezo Aho logo and the message “Don’t beach seine, spear fish”. Sails have been painted to serve as moving billboards about destructive fishing methods along Madagascar’s southwest coast. © Blue Ventures.

The *Velondriake* marine management initiative in Madagascar represents use of customary laws for sustainable management of the fisheries from which people have constructed their meaning of existence. The need for conservation arose after overexploitation of the fisheries due to population growth and commercialisation of traditional fisheries which led to destruction of the surrounding reefs and a decline in fish catches that people depended on. The ensuing efforts to put in place a management framework resulted in the *Velondriake* network, which is largely a community-based management system. ‘*Velondriake*,’ which means ‘to live with the sea’ signified a series of management agreements in the area, resulting in the institution of a number of short-term closures of reef flats to octopus fishing. This system involves a total of 25 villages, and approximately 7 500 people who depend on the sea for their daily subsistence, income and cultural identity (Westerman

and Gardner 2013). The total area under *Velondriake* management is 823 km<sup>2</sup> in size, covering over 40 km of coast (ibid, p 45). As part of the management processes, ancestral ceremonies were performed to sanctify the establishment of the area. On 24 October 2004, fishers of the Andavadoaka area signed a traditional law, called *dina*, to close the reef flat around the island of Nosy Fasy, also known as Ankereo, to octopus fishing for seven months from 1 November 2004. The *dina*, a set of local laws that regulate resource use within the *Velondriake* was ratified by the Malagasy regional court system in 2006 to become legally binding. It accords to local people several powers including banning destructive fishing practices, regulating closures of temporary octopus and mangrove reserves, governs permanent reef reserves and provides conflict resolution powers (summarised from Westerman and Gardner 2013, Harris 2007, Westerman and Gardner 2013).

and Wilson 2011). The main reasons for this are ‘to assess the costs and benefits of an action or policy, as an aid to decision making; [and] to improve understanding of the value of benefits to society from an ecosystem or series of linked ecosystems’ (UNEP-WCMC 2011). A common practice in the valuation of resources has been to compare estimates of their consumptive and non-consumptive uses (UNEP 2006). Ecotourism is perhaps the best example of

the non-consumptive uses of resources as a conservation strategy in the region. Yet, where it has been adopted, it has often demanded trade-offs in exchange for compliance on the part of users to discard consumptive, presumably more materially beneficial uses, to less attractive but ecologically more sustainable activities with assumed long-term gains such as social benefits (improved income). Both material and non-material incentives have been used to secure

compliance with more environmentally friendly conservation mechanisms (Hicks and others, 2009).

### **ECOTOURISM AND CONSERVATION THROUGH NON-CONSUMPTIVE USES OF RESOURCES**

**Ecotourism**, referred to as responsible tourism, is discussed in this section in relation to its socially and environmentally responsible attributes, and with reference to its potential to realise key economic and social dimensions in conservation (Gautam 2010). Numerous examples of ecotourism projects are found in the region. Two examples are provided to reflect its economic and social aspects, the willingness to pay principle (WTP) and species-specific conservation. The conservation potential of ecotourism is described in terms of its benefits in minimising direct resource extraction, and contributing differently to social development, mainly through employment generation with specific benefits for women. An added aspect is its potential for fairer benefit-sharing among stakeholders, often an incentive for local people to conserve (Gautam 2010). However, ecotourism, as a non-consumptive use, has proven to demand higher levels of investment to make it sustainable, eg in infrastructure, making its costs also high (Troëng and Drews 2004).

**Willingness-to-pay:** The conventional economic principle of ‘willingness-to-pay’ (WTP) for ecosystem services, including recreational, aesthetic and cultural services, is an economic-cum-social value attached to conservation and is widely used in ecotourism projects. This principle equates a relationship between a user and the quality of a resource with the assumption that, if the resource is of good quality, then it is worth paying for [its services]. Efforts to establish people’s willingness-to-pay for certain services, such as for their aesthetic value, also provide a reflection of people’s willingness to pay for protection of resources or species, and these values demonstrate the value of biodiversity (Bullock and others, 2008).

A study conducted in the Seychelles sought to establish the value of marine national parks (MNPs) to the Seychelles economy by calculating the difference between what visitors would be willing to pay to visit marine parks and what they actually pay (consumer surplus estimate). Out of 300 surveys, 270 surveys yielded an average value for willingness-to-pay of 61 Rupees (US\$12.20), which exceeds the R50 (US\$10) fee instituted in 1997. The difference between these two amounts is the consumer sur-

plus (CS), representing the portion of the value of visits that is above the market price. The average consumer surplus was 11 Rupees (US\$2.20), providing an estimate of the total potential consumer surplus of 440 000 Rupees (US\$88 000), given that 40 000 tourists visited the Seychelles MNPs in 1997. Reasons associated with the higher WTP included expectations of good diving, good weather and visits to protected as well as romantic locations; tourists who specifically stated that the protection and conservation of marine resources was their primary motivation were fewer. Users’ stated WTP can be related to intended use of the resource (a desire to dive implying that they are attracted by underwater biodiversity), with some secondary interest in the protection of marine resources generally (summarised from Mathieu and others, 2000).

**Species-specific conservation from a social dimension:** Species-specific conservation incorporates major social and economic aspects. These touch on people’s arrangements to earn a livelihood and pressures of the market that often bear negatively on resources, contributing to their over-exploitation to the point of endangerment (Sea Sense 2012). The related interventions integrate not only capacity-building in the management of a species through education, but also through compensation for the loss of traditional consumption patterns with changes in resource use (Gautam 2010). Even though eradicating unregulated exploitation of these resources cannot be fully achieved, efforts in management training, promoting environmental awareness and, equally important, streaming broad-based sources of revenues back to individuals and communities have, to some extent, promoted compliance among users, some of whom have committed themselves to protection (Troëng and Drews 2004).

**Marine turtle protection:** The Marine Turtle Conservation Strategy and Action Plan for the Western Indian Ocean (1996), which was drafted by countries in the region at Sodwana Bay, South Africa, incorporates among its provisions, the elucidation of social and economic issues related to the protection of marine turtles in the region. This was based on the realisation that economic factors, including the trade in turtle products, have been the most significant factors accounting for their decline, while other anthropogenic problems such as threats at nesting beaches, the opportunistic capture of turtles or harvesting of their eggs, fisheries by-catch associated with trawling operations, and threats from pollution are also seen as contributors to their declining populations (Muir 2005). Management interven-



**BOX 11.2.****TORTOISESHELL AND TOURISM: HAWKSBILL TURTLES IN THE SEYCHELLES**

Young Hawksbill turtle (*Eretmochelys imbricata*) from Réunion Island. © Bruno Navez.

Fishing hawksbill turtles for their shells has a long history in the Seychelles and has been a significant income earner for local people. Records indicate that at least 83 221 kg of raw shell were exported between 1894 and 1982. Export of shell declined between 1925 and 1940, partly as a result of a decline in the price for shell. Increasing international prices in the 1960s attracted more exports. In 1982, 591 kg of raw shell corresponding to 1 182 hawksbill turtles was exported at a price of ~US\$148.7/kg, yielding a gross revenue of US\$87 878. Even when the major hawksbill shell importer, Japan, banned imports of tortoiseshell in December 1992, the sale of tortoiseshell items continued in the Seychelles. After 1992, the gross revenue of tortoiseshell artisans from the domestic trade was estimated at US\$264 091 (Seychelles Ministry of Industry Statistics). Approximately 40 tortoiseshell artisans (representing 0.15 of the Seychelles workforce at the time) were active in 1993.

In 1993-1994, the Government of the Seychelles made a decision to reverse the decline in marine turtle populations. It compensated 37 hawksbill shell artisans (at an average of US\$15 000 per artisan) through a Global Environment Facility (GEF) and Seychelles Government-funded program and retrained them in other trades; they subsequently agreed to

sell all their tortoiseshell stocks to the Government. The 2.5 tons of tortoise shell acquired through this process were ceremoniously destroyed and a ban on all consumptive use and harassment of marine turtles was declared in 1994. The total cost of the program, approximately US\$805 000, was split between the Seychelles Government and the GEF. Marine turtles have subsequently become an important component in Seychelles tourism, which is the major economic sector of the Seychelles, with gross revenues accounting to a total of US\$750 million per year.

Efforts to quantify the economic market value of Seychelles marine turtles to create local incentives for their conservation are on-going. Protection of nesting beaches has resulted in increased nesting within some Seychelles protected areas. It is hoped that, as marine turtle populations recover, their increased abundance will result in more sightings that will facilitate the marketing of marine turtle tours, in the water and on nesting beaches. An equally important consideration will be to make sure that individuals who used to benefit economically from their consumptive use, receive economic benefits from their non-consumptive use (summarised from Troëng and Drews 2004).

tions which followed put in place protective strategies that took the social and economic needs of immediate users into account, such as compensation to stop extractive use, education and ecotourism (Troëng and Drews 2004, Sea Sense 2012). Experience of Seychelles is given in Box 11.2.

**Mangrove boardwalk ecotourism:** Inclusiveness, benefit-sharing and stakeholder participation in conservation efforts are key considerations in ecotourism efforts. This is evident in **mangrove boardwalk projects** that have been introduced in the WIO to promote ecologically sensitive uses of mangroves through community-based tourism. The projects are managed by women, but also to ensure their inclusion within the diverse uses and needs of conservation practice. The projects have proven a positive intervention for coastal women who having comparatively lower income-earning opportunities than men, and are also key stakeholders in the use of mangroves, both extractive



Figure 11.1. The Gazi mangrove boardwalk. © José Paula.

and non-extractive.

In Zanzibar, women around the mangroves of Pete in Menai Bay near Jozani Forest Reserve manage a raised boardwalk inside the mangrove forest. This allows tourists to see the complex communities of flora and fauna found in the ecosystem and revenue earned from the boardwalk is used for community development projects. Such community initiatives provide an incentive to conserve resources, as well as education for local people who live far away from mangrove forests. Other examples are found in Kenya, where women in Gazi and Wasini operate similar projects. Visitors to Gazi Bay are encouraged to visit the women's managed boardwalk. From 2008, the number of visitors increased steadily to reach 1 673 visitors in 2010. The entrance fee is 100 Kenyan shillings (Ksh); students pay less. Some income is

acquired though the sale of food at the entrance to the boardwalk at a cost of Ksh 200 per person (UNEP 2011). Cash income from women in Gazi Bay only came from this ecotourism initiative in 2011 (UNEP 2011). At Wasini, the boardwalk project generated US\$6 500 from entrance fees in 2002, of which US\$2 000 was used to set up a craft shop and US\$2 800 given to members as dividends (Zeppel 2006). Although total compliance with unregulated mangrove cutting may not have been achieved consistently amongst the stakeholders, community members acknowledged that capacity-building and the associated financial incentive had promoted compliance with the resource use regulations and management within the mangroves (UNEP 2006).

**Benefit-sharing for conservation:** Dolphin watching is widely regarded as a sustainable non-consumptive alternative to the direct exploitation of these species. Its added advantage (when compared to turtle conservation) is the recreational opportunity offered to swim with these friendly animals. A study by the Zanzibar Association of Tourism Investors (ZATI) estimated that dolphin trips account for six per cent of all excursions by tourists in Zanzibar. It is estimated that the purpose of approximately 4 800 trips per year are for dolphin viewing and swimming (Gautam 2010). Dolphin tourism has been promoted amongst communities throughout the region, with active engagement of local people, providing some employment in the hospitality industry or as boat operators. Revenues collected by the Menai Bay Conservation Unit (Zanzibar) in dolphin tour boat operations in two of the villages adjacent to the Park at Kizimkazi Dimbani and Kizimkazi Mkunguni between July 2009 and March 2010 b totalled TShs 47 422 000 (~US\$34 600) (Gautam 2010). In real terms, however, the benefits do not go to the local communities. Of the entry fee of \$3 that the MBCA charges, only \$1 is supposed to go back to the 19 villages adjacent to the Park; other returns are shared by boat owners (hotels, restaurants, individuals) and tour guides from outside the area who organize the trips. The proportion of tourists that use local accommodation facilities is also very low, suggesting that most of the benefits accrue outside the communities (Gautam 2010).

**Codes of conduct and permits for conservation:** Complying with a code of conduct as a social principle in biodiversity conservation constitutes best practice. This is evident in the dugong protection project in Mozambique and boat-based whale watching and shark diving in South Africa. By way of example, boat-based whale watch-

ing is a commercial enterprise in many parts of South Africa, including the KwaZulu-Natal coast, and was legalised in 1998. The industry is regulated by a system of permits whereby permit holders are allowed to operate within designated sections of the coast, usually with only one permit being allocated per coastal section (Turpie and others, 2005, Turpie and Wilson 2011). The South African Boat-based Whale Watching Association (SABBWWA) has developed a Code of Conduct for permitted operators, as well as a training course for guides. The overall number of boat-based whale-watching permits issued by Marine and Coastal Management has steadily increased since 1999, with a maximum of 18 permits issued for 2004 (SAEO 2004). An economic assessment of boat-based whale watching in South Africa established that the industry generated about R45 million in tourism expenditure in 2004 and contributed approximately R37 million to South Africa's gross domestic product per year, with the potential for even greater economic success (SAEO 2004). The potential to increase the number of boat-based whale-watching permits in future was seen to be as great as up to 40 per cent but was to be regulated relative to existing supply and demand, untapped markets and sensitivity to the well-being of the resource (SAEO 2004). Therefore, boat-based whale-watching is seen as a viable industry, adding significant economic value to the marine tourism industry with some conservation benefits (SAEO 2004).

However, several challenges face such ecotourism-initiated strategies in the region. These include the capacity of governance structures to maintain efficiency and compliance in the operations, particularly when management interventions are associated with incentive-driven conservation. Compliance with conservation measures comes under threat when the desired material incentives offered to collaborating local communities are not realised. Inequities in benefit-sharing from ecotourism projects are also problematic, as shown above. In such cases, estimation of the costs of biodiversity loss is needed to inform decision-makers where investment in conservation needs to be prioritised.

### THE COSTS OF BIODIVERSITY LOSS

An analysis of replacement costs for biodiversity loss, ie the amount that would have to be spent to replace ecosystem services that would otherwise have been provided by biodi-

versity, is often invaluable and, in economic terms, very high (Bullock and others, 2008). The loss is actually determined by measuring the economic value of the biological resources and hence, the expected services (UNEP 2011). Dynamite fishing, a pervasive practice in certain parts of the WIO, is indicative of the fact that there are still many challenges regarding compliance in the region, including institutional challenges that are exacerbated by prevailing social and economic contexts. Dynamite fishing causes significant loss of coral reef biodiversity, leading to the loss of the aesthetic value of affected reefs and, hence, their attractiveness for tourism; risk of harm to humans; and eventual loss of livelihoods due to destruction of the resource base (Samoilys and Kanyange 2008, Sea Sense 2012).

Loss caused to an ecosystem by natural factors has also been estimated by costing the value of services lost. For example, "the welfare losses from ecological damage to Zanzibar's coral reefs in **Tanzania** were estimated using the cost of [visitor] trips [to the reef] as a payment vehicle, before and after the actual change in quality occurred. The annual loss from coral bleaching was estimated to be \$22.0–\$154.0 million, implying \$254 to \$1,780 per visitor (prices and costs deflated to 1997 USD)" (Conservation International 2008).

### MANAGEMENT RESPONSES TO BIODIVERSITY CONSERVATION

Governance regimes that support integrated approaches on the management of marine resources and ecosystems are currently common in the WIO region. Such ecosystem-based management pays attention to both social and ecological dimensions of resource management, and interactions between humans and the environment (Abernethy and others, 2014). Decentralized resource management approaches that embrace community-led initiatives and devolve decision-making processes to the latter (Abernethy and others, 2014) are now accepted, and uphold social benefits, ownership and economic benefit-sharing amongst local communities.

**Marine Protected Areas:** Marine protected areas (MPAs), which are area-based management systems, incorporate a range of resource use and management arrangements, including no-take zones (NTZ), or temporary or permanent closures. MPAs are the most visible management responses to biodiversity conservation and fisheries management needs (Muthiga and others, 2003, Mwaipopo



**BOX 11.3.**

**TOTAL ECONOMIC VALUE (TEV) COMPARED TO REPLACEMENT COSTS**



Exploitation of mangrove poles at Gazi Bay. © José Paula.

An economic analysis of the mangrove forest of Gazi Bay in Kenya conducted in 2011 estimated the Total Economic Value (TEV) of these mangroves to be US\$1 092.3 ha<sup>-1</sup>y<sup>-1</sup>. The valuation incorporated the range of goods and services provided by the mangroves, including its contribution to the fishery, provision of building poles, fuel wood, ecotourism, research and education, aquaculture, apiculture, shoreline protection, car-

bon sequestration, biodiversity and existence value. Direct uses accounted for around 25 per cent of the TEV, indirect uses represented 20 per cent, and non-use values 55 per cent. (UNEP 2011). The replanted area of 7 ha of *Rhizophora mucronata* was valued at US\$2 902.9 ha<sup>-1</sup>y<sup>-1</sup> which, although debated, is higher than the TEV estimates in the UNEP (2011) study, indicating costs of biodiversity loss to be even greater (UNEP 2011).

2008, Roccliffe and others, 2014). MPAs were introduced largely as state-driven structures for resource governance, followed by fewer privately-managed MPAs (such as Cousin Island, Seychelles, and Chumbe Island Coral Park, Zanzibar). The number of community-based marine parks and reserves are currently increasing, each with different ecological, social and economic objectives and benefits. This has led to increasing experience in MPA management, evolving from initial top-down management initiatives with negative social costs, human exclusion and diminished local livelihoods, to efforts that promote inclusive, co-management approaches and decision-making platforms across different levels of MPA governance (Samoilys and Obura 2011).

The area of currently designated MPAs in the region as provided in Table 11.1 and illustrates the level to which WIO countries are achieving Target 11 of the AICHI Biodiversity Conservation targets. These targets stipulate that by 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially

areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape' (Convention on Biological Diversity Strategic Plan 2011-2020).

The benefits of co-management approaches in MPA management are becoming increasingly clear, particularly as studies in the region address the multiple dimensions of various ecosystems, covering biological, cultural, economic and political concerns, and empowering communities through collaborative and integrated conservation efforts (Granek and Brown 2005, Westerman and Gardner 2013). The social benefits include reduced costs for management; reduced conflict between stakeholders, especially on access issues and livelihood sustainability; and increased legitimacy as well as acceptance of MPAs by promoting local ownership (Granek and Brown 2005). MPAs have also been documented to provide economic



**Table 11.1.** Percentage of surface area under protection in the WIO countries (2012). Source: World Bank databank website (2014).

Country	% surface area under protection in 2012*
1 Comoros	33.5
2 Kenya	20.5
3 Madagascar	-
4 Mauritius	1.0
5 Mozambique	0.2
6 Reunion	-
7 Seychelles	8.6
8 Somalia	12.8
9 South Africa	9.4
10 Tanzania	30.4

benefits in the long run, such as increased catches per unit effort following conservation measures, all of which have alleviated some negative perceptions regarding displacement from traditional fishing grounds (Cinner and others, in press).

More recent initiatives on area-based conservation are in the form of **Community Conservation Areas (CCAs)** or **Local Marine Management Areas (LMMAs)**, which embrace what are regarded as the most socially-responsive structures of governance (Rocliffe and others, 2014). These areas, which are governed by community-based systems, elicit a sense of local ownership, and are credited as being grounded in systems that ‘appear to be embedded in the wider social-cultural context of the local communities’ (Westerman and Gard-

#### BOX 11.4.

#### INCLUSION, COMPLIANCE AND BENEFITS



Sign of Moh'eli Marine Park in Comoros. © Chris Poonia.

Moh'eli Marine Park in the Comoros Islands has been operational since 2001 and was designed as well as implemented using a co-management approach. With a land surface area of 212 km<sup>2</sup>, the park is fringed by alternating sandy and rocky beaches with intermittent mangrove forest along the

south-eastern and southern coast. During its establishment, it was clear that financial, technical, and personnel assets of the Comorian government were inadequate to address the issues required for conservation. It was noted that one of the ways to succeed should be to rely on the participation of the

local communities. Also, in order to promote conservation at the community level, it was ensured that local people would benefit materially from areas selected for protection. In addition, it was realized that those who would be enticed to encroach on the protected areas, or who would oppose their management as protected areas, should receive legitimate alternative livelihoods. Thus, community members were included in the processes of park boundary delineation and guideline formulation, and were made responsible for coordinating monitoring as well as enforcement within the park. Consensus was reached among the national and regional environmental management authorities and representatives of the villages adjacent to the park and local community organizations, specifically village environmental associations, and fishers' associations. Being a largely patriarchal society (although matrilineal), women were not consulted at the beginning. Yet, since they were key stakeholders in resource extraction, the project recognized that their participation was critical to the long-term success of conservation efforts in the Comoros.

The proposed goals of the park and its core reserves were to protect Comorian biodiversity and improve local as well as regional fisheries. Reserve locations were determined using anecdotal data from fishermen, and sites were selected to represent diversity of regional habitat types (rocky shores, mangroves, channels, reefs, sand flats, sea-grass beds and

islets). Sites of biological importance were also reserve targets. They included juvenile fish habitats, spawning grounds, and rare marine habitat types.

Strengths of this approach included the following:

1. Integrating education, use of local knowledge, capacity building, and community commitment. This partially mitigated lack of resources, weak government enforcement and inadequate scientific data, but also created local interest.
2. Use of local eco-guards for each of the ten adjacent villages to police the park, their training and the monitoring approach created a communication network previously absent among neighbouring villages. It fostered trust among villagers previously wary of each other.
3. Co-management empowered community leaders and circumvented traditional hierarchical political structures.
4. Traditional knowledge served as a substitute for limited ecological data and provided an impetus for local monitoring to enhance future conservation efforts, and greater village participation.

Some Lessons: Building trust and achieving consensus for conservation purposes is time-consuming and generates significant local support. The initiative involved daily monitoring by the entire community and generated material benefits from an improved ecosystem (summarized from Granek and Brown 2005).

ner 2013). LMMAs are managed for sustainable use rather than conservation per se, employing a range of management techniques, including periodic closures, gear restrictions, species-specific reserves and permanent, fully protected (closed) no-take zones (Rocliffe and others, 2014). LMMAs are becoming increasingly recognised as creating higher levels of social capital, local responsibility for resources and a commitment to resource ownership (Hicks and others, 2009). CCAs or LMMAs are now found in nine countries in the region. However, WIO countries are acknowledging the complexities of governing the marine environment, taking into account its multiple uses, their different levels of power, and gaps in the knowledge of processes that affect biodiversity such as climate change. Networking is needed to develop a multi-dimensional approach to marine conservation. Collaborative fisheries and mangrove management areas or networks provide examples of this (Sesabo 2007).

These facts reveal how MPAs have, as management responses, in some ways managed to provide resource protection within largely acceptable measures for management; partnerships between diverse stakeholders (managers, users and others), which are critical for management success; and strategies that promote community ownership with material incentives for local people (Muthiga and others, 2003). Strengths of such community-based strategies include the provision of ownership and responsibilities across horizontal scales. With further regard to scale, many outcomes are, however, challenged by the low capacities of coastal communities as primary stakeholders. In many cases, multiple stakeholders with different uses and powers of access to resources, compete with or override compliance procedures. Sometimes local communities have also failed to address resource degradation when caused by factors beyond their capacity to deal with or control, such as pollution, oil spills and climate change.

**BOX 11.5.****STRATEGIC ALLIANCE - KURUWITU COMMUNITY MANAGED CONSERVATION AREA (KCMCA), KENYA**

Members of the Kuruwitu Conservation and Welfare Association with the candidates of WIO-COMPAS Level 2 and Assessors in Kikambala, 2011. © Peter Chadwick.

The Kuruwitu Community Managed Conservation Area (KCMCA) was established in 2011 by the Kuruwitu Conservation and Welfare Association (KCWA) of Kenya with support from the East African Wildlife Society (EAWLS). The KCMCA was Kenya's first community-based marine protected area. It brings together artisanal fishers and private beach residents along the Kuruwitu-Vipingo coastline in Northern Kenya. The KCMCA's goal is to promote sustainable use and management of coastal and marine resources in the area. It covers six fish landing sites: Mwanamia, Kijangwani, Kuruwitu, Kinuni, Vipingo and Bureni, in Kilifi County. Stakeholders voluntarily agreed to close some of their fishing grounds for conserva-

tion with monitoring for use of illegal fishing gear. Spanning a wide area, the KCMCA stakeholders are able to oversee the multiple aspects and processes that impinge on the environmental health of their coast, unlike initiatives that focus on a small area. Ecological monitoring surveys by the Wildlife Conservation Society (WCS) have revealed fish population recovery over a relatively short space of time (McClanahan, unpublished data). Fishery recovery has lately attracted interest from various fishing communities who are now recognising benefits of CCAs in addressing threats to their marine environment, ie overfishing and the use of destructive fishing methods. (Summary from Maina and others, 2011).

## RECOMMENDATIONS FOR POLICY

Conservation initiatives in the WIO illustrate that, unless economic and social aspects of biodiversity conservation are addressed more comprehensively, it is highly likely that degradation to the marine environment will continue, to the detriment of humanity and society. At the same time, management interventions have revealed that

appropriate options are available on the ground, especially in the form of co-management and community-based protected areas. However, these need to be supported and enhanced to address the challenges imposed upon them by economic and social contexts, as well as by management and institutional issues. Therefore, policy decisions informed by research are needed on relevant approaches and interventions for biodiversity



conservation that fully address its combined economic, social and ecological implications. The following is recommended:

- It is important that ecosystem-based management interventions be rolled out to promote co-management approaches which are inclusive and participatory.
- The capacity of stakeholders needs to be enhanced to respond effectively to the multi-dimensional challenges of conservation management, particularly its human, technological and institutional aspects.

- More comparative research is needed in the region to disseminate good practices and innovative methods such as those applicable to species-specific conservation.

- Research and integrate costing of biodiversity and ecosystem services need up-scaling into policy to establish the cost-benefit biodiversity conservation and biodiversity loss.

- Decision-makers as well as managers should find ways to incorporate ecosystem services that lack ready market values, such as customary and heritage values, as incentives for conservation.

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