Chumbe Island Coral Park -
A Private Marine Park in Zanzibar (Tanzania)

By Sybille Riedmiller

Managing Director

Abstract

Chumbe Island Coral Park Ltd (CHICOP), established in 1991 and probably the first fully functioning MPA in Tanzania, illustrates issues for a privately created and managed marine park in a developing country in Africa. Property and fisheries legislation and the institutional environment of Zanzibar (Tanzania) made the park possible, but required higher investment than anticipated. Management costs are funded though ecotourism and much lower than donor-funded government-run park budgets. Particularly training and employment of local fishermen as park rangers by volunteers proved cost effective and facilitated direct partnership with local fishing communities.

Non-extractive and non-destructive use through ecotourism adds economic value to coral reefs and creates incentives for effective and sustainable conservation. The private sector can play a decisive role in establishing and managing no take ecological marine reserves that support biodiversity and fisheries. Private sector cost control and income generation create better prospects for sustainability. To encourage private investment in partnerships for conservation, a conducive investment climate, security of tenure and contractual security are essential. International insurance schemes for MPAs could help buffer risks of volatile tourism markets.

In donor-dependent countries in the developing world effective park management may require a change of paradigms. It must be acknowledged that direct resource users, fishers and tourism operators respond to economic incentives and belong to the formal and informal private sector, while government and donor agencies are stakeholders with institutional interests that provide few incentives for effective conservation of a particular area. Commercial risks of the private sector need to be acknowledged and competition from over-funded donor projects avoided. Where governance is problematic, environmental certification is more effective for responsible management than state regulations. Finally, international donor support should seek partnerships with direct resource users from both the informal and formal private sectors, including privately managed MPAs.

1. The Chumbe Island Coral Park Project

Chumbe Island Coral Park Ltd. (CHICOP) is a private marine conservation project established in 1991 for sustainable management of uninhabited Chumbe Island, a small coral island of 22 ha. located 8 miles southwest of Zanzibar town. Chumbe is covered by a semi-arid coastal forest and bordered, on its western shore, by a fringing coral reef of exceptional biodiversity.

In the early nineties, Chumbe Island offered ideal conditions for the establishment of a small totally protected marine protected area (MPA). Bordering the shipping channel between Zanzibar and the capital of Tanzania Dar es Salaam, its western fringing reef had for decades been off-limits for local fishers, as the traditional dugouts and outrigger boats would have obstructed the way of large vessels. In addition, a military base on the adjacent coast used the area around Chumbe for shooting range exercises. Yet the island had not been included in earlier proposals for MPAs in the country.

Based on the initiative of CHICOP, the island and part of the fringing coral reef were gazetted in 1994 as a protected area by the Government of Zanzibar that has semi-autonomous powers over its natural resources within the United Republic of Tanzania. CHICOP was given management rights and has developed a Visitors' centre, nature trails and eco-bungalows. Ecotourism to Chumbe supports park management and an education program that includes island excursions for local schoolchildren. Project objectives are non-commercial, while operations follow commercial principles. From 2000, running costs of park management are fully covered from proceeds of tourism operations.

2. Chumbe Island: effective and sustainable conservation management on the ground

Strict but non-violent enforcement through Park Rangers

Park Rangers patrol the island to ensure that regulations prohibiting fishing and anchorage in the protected reef and guarding of the closed coral-rag forest habitat are observed. The Chumbe Rangers carry no arms and rely on persuading fishers. They monitor any event or infringement, and their reports provide daily data from 1992, on the type, number and names of vessels involved, nature of the intended activity and the fishers' reaction to the Rangers' intervention. They also record observations on any major change in the coral reef, such as storm damage or coral bleaching. Due to their committed work, there are now no major problems with infringements from fishers or other users, and the project is well accepted by the local communities (Carter et. al. 1997). This success confirms research findings on the effectiveness of parks in protecting tropical biodiversity that included 93 parks in 22 tropical countries. Enforcement was found to be one of the key ingredients of park success (Bruner et.al. 2001).

Research and monitoring

Baseline surveys, research and monitoring provide data on the marine and terrestrial ecology of Chumbe Island. Research is coordinated with the Institute of Marine Sciences of the University of Dar es Salaam and regulated by the Chumbe Island Management Plan 1995-2005.

As a result of successful management the coral reef has become one of the most pristine in the region, with 370 species of fish (Fiebig 1995) and over 200 species of scleractinian coral, at least 90% of all recorded in East Africa (Veron, pers. com. 1997). Findings also suggest that the coral communities in the sanctuary have survived the 1998 bleaching event relatively unscathed.

Sanctuary for endangered species

The forest covering the island is one of the last pristine 'coral rag' forests in Zanzibar (Beentje 1990), particularly after successful rat (*Rattus rattus*) eradication in 1997. The Forest Reserve has now become a sanctuary for the highly endangered endemic Aders' duiker (*Cephalophus adersi*) probably facing imminent extinction from poaching and habitat destruction in its original range in Zanzibar (Kingdon 1997). Three breeding pairs of duikers were translocated to the island in 2000 with support of Zoo Munich-Hellabrunn, Chicago Zoological Society, Flora and Fauna International (UK) and WWF-Tanzania. Chumbe also has the world's largest known population of the rare Coconut crabs (*Birgus latro*) recorded as 'data deficient' in the IUCN Red data book. Attracted by the abundant fish in the reef sanctuary, the rare Roseate terns (*Sterna dougalli*) bred on Chumbe Island in 1994 (Iles 1995).

Eco-Architecture and Eco-Technology
Chumbe Island is a pristine fossil coral island that has no fresh water supply other than seasonal rains. To protect the sensitive coral communities in the fringing Reef Sanctuary from sewerage runoff and pollution, zero-impact architecture and operations were introduced. All buildings function as self-sufficient units generating water and energy with rainwater catchment and filtration, solar water heating and photovoltaic electricity. In particular:

- **Composting toilets** recycle human and organic waste in a sustainable way. No liquid sewage is generated, organic waste is reduced to one sixth of its original volume, turned to compost and used in grey water filtration plant beds. Organic kitchen waste is recycled in compost beds that provide for the composting toilets. Other waste is removed from the island.

- **Vegetative grey water filtration** also avoids introducing nutrients. Waste (grey) water from showers, washbasins and kitchen is filtered through plant beds that absorb phosphates and nitrates and thus remove nutrients before the waste water enters the eco-system.

- **Avoiding nocturnal light pollution**, walkways, nature trails and beach areas are not artificially illuminated. This protects feeding and breeding patters of nocturnal animals and also helps preserve and view one of the most stunning attractions of Chumbe Island: the rare giant Coconut Crabs (*Birgus latro).*

- **Cooking energy** remains a challenge against a backdrop of rapid deforestation in the country. Several cookers have been tested, e.g. solar boxes, parabola solar-cooker, low-pressure gas cooker, kerosene cookers and traditional charcoal stoves. A fuelwood saving stove constructed on the island is now being used as the most appropriate and cost-effective solution so far.

Limiting human impact with visitors' management and education
Permitted uses of the marine park include recreation (swimming, snorkeling, underwater photography), education and research. Extractive and destructive activities, such as fishing, anchorage, collection of specimen (even for research) are not allowed.

Overnight capacity does not exceed around 5000 visitors/year. No further construction of overnight facilities is planned. Day visitation to the park is also

limited and regulated by tides to avoid damage to the coral reef by boats crossing over in low waters.

All visitors join a guided snorkeling and walking visit to the Reef Sanctuary and the Forest Reserve before moving around on their own. The former lighthouse keepers' house has been carefully restored and converted into a Visitors' Centre that includes a classroom for local schoolchildren.

Operational costs fully covered by tourism proceeds
Present minimum operational costs are around US$ 150.000 per year. These are fully covered from tourism proceeds from 2000, the third year of operations, despite major fluctuations of the occupancy rate due to the volatile tourism market. Thus the total annual operational costs of CHICOP roughly equal the cost of one technical advisor to donor-funded conservation projects alone.

3. Critical issues for the establishment and management of the MPA

3.1. Winning political and public support

Coral reefs in Tanzania and Zanzibar are under serious threat. Over-fishing, dynamite fishing and other destructive fishing practices, pollution and sedimentation have led to bio-physical deterioration of formerly pristine reefs. Fish landings that provide most food protein in Zanzibar and along the coast, have been declining over the last decade.

While coastal communities depend on fishing and possess a wealth of traditional environmental knowledge (Tobisson et al. 1998), reef management is only beginning to be seen as a necessity (Scheinman and Mabrook, 1996). In the national language Kiswahili, corals are mostly referred to as 'mawe na miamba', stones and rocks. Formal education does also not yet provide environmental information on this important natural resource (Riedmiller, 1991, 1995). As a result, decades of destructive fishing methods, such as blast fishing, coral smashing to chase fish into encircling fishing nets and beach-seining, have until recently met with little public and governmental concern (UNEP-RSRS, 1989; Horrill, 1992; Guard, 1997). Several marine parks designated along the coast in the early seventies remained on paper only (Jameson et.al. 1995).

Campaigning for the MPA
Therefore, when the project started in the early nineties, there was a strong case for lobbying for conservation and sustainable management of coral reefs and coastal zones, among resource users, political leaders and the general public in Tanzania and Zanzibar. With the increasing pressure on coastal resources and the generally weak enforcement of fisheries regulations, the understanding and support of local fishing communities became essential to the effective protection of the Chumbe MPA from exploitation, fishing and anchorage. The CHICOP management team relied on educating and convincing local fishers about the benefits they could gain from a small totally park, assuming that natural restocking of the adjacent reef areas would in few years help in this process.

Village meetings

Therefore, during 1991, and with the decisive support of representatives of the Departments of Environment and Fisheries, meetings were held in several fishing villages along the adjacent coast, to present the project to villagers and win their support. As expected for an off-limits area, few people felt affected by the closure of the reef. However, villagers asked for being given preference in employment over urban people. Assured of this by the project team, they proposed candidates among the fishermen to be employed and trained as park rangers. Candidates had to be literate, good swimmers and experienced fishermen, sympathetic to the project objectives and interested in being trained in new skills.

Training fishers as Park Rangers
From late 1992, as soon as the project had been approved by the government and even before the park had been gazetted, five local fishermen were employed by CHICOP, stationed on the island, and over several years trained on-the-job by volunteer marine scientists and educationists. This rather informal training focused on coral reef ecology, advantages of a totally closed area, aims of the Chumbe project, and how to communicate this all to their fellow fishers and villagers. The rangers were also trained to produce daily monitoring reports on any events and to help researchers with the baseline surveys. English language training and visitor guidance skills were added to this later.

Informal on-the-job training by volunteers
This combination of local fishermen trained by volunteers on the job proved very successful. In spite of the violent nature of some of the fishing methods used in the area, the Chumbe park rangers do not carry arms and have no powers of enforcement. Traditional subsistence fishers responded well, helped by increased catches in adjacent reefs few years after closure. The rangers work in two- to three-weekly shifts on the island and return to the village and fishing during their off-time. This also helps maintain close bonds with villagers.

Park Rangers helping fishermen in emergency.
In the absence of marine rescue services in the country, local fishers also welcome the presence of fully equipped rangers on the formerly uninhabited island. Rangers help in cases of distress, storms, engine failure, loss of boats or lack of drinking water, having probably saved several lives. They also keep the Chumbe lighthouse functioning, an important service for traditional vessels (dhows) lacking modern navigational aids such as GPS.

Infringements
While initial community response had been encouraging, challenges to the establishment of the park increased during project implementation. The booming tourism industry created a rapidly growing market for marine products and contributed to over-exploitation. High prices made fishing an attractive occupation for urban youth who could afford modern propulsion and fishing gear and had little respect for traditional fishing grounds and the more conservative traditional fishing practices. During election times party politics also played a role.

Infringements of park regulations reached a peak in 1994/95 when groups of up to 15 fishing boats challenged the park rangers by simultaneously dropping anchor and fishing in the park, sometimes threatening with violence. Management Agreements

oblige Government to assist CHICOP with enforcement, but government support was weak then and enforcement left to the unarmed park rangers who had limited powers of enforcement.

Advisory Committee
With decisive support of the Institute of Marine Sciences of the University of Dar es Salaam, an Advisory Committee was established that helped overcome the crisis. It included representatives of the Departments of Fisheries, Forestry and Environment, the Institute of Marine Sciences and local fishing communities.

Management Plan 1995-2005
A wide variety of stakeholders was involved in discussions on the Chumbe Island Management Plan 1995-2005, with support from the British volunteer agency BESO and the German Tropical Forest Stamp Program.

School excursions for snorkelling and nature trails
Taking schoolchildren for day excursions to the island also helped win public support. Guided by park rangers, they walk along nature trails and learn how to swim and snorkel over the reef. This is a unique opportunity particularly for girls who are not normally given that chance in the Islamic tradition of Zanzibar.

Are up-market guests disturbed by school children?
Initial concerns about a potential conflict between up-market tourism and island excursions of local school-children proved unfounded. Indeed, project experiences so far are that guests are not disturbed by school children sharing the island with them. A combination of targeted ecotourism marketing, efficient management of the trips and the generally well-behaved schoolchildren of Zanzibar have so far allowed us to run the school trips even during high season. Some guests are delighted to help the rangers organize the kids.

3.2. Policy, legal and institutional context: Opportunities and limitations

Economic liberalisation and tourism creating a market for conservation.
In the late eighties, Zanzibar had developed a severe economic crisis due to decades of state-controlled economic policies and over-dependence on one cash crop, cloves, that had lost its value on the world market. This opened the way for economic and political liberalization, and for tourism as an alternative source of income. Tourism has now become the leading sector of the economy with average annual growth rates of above 10%. This resulted in a rush of (sometimes speculative) 'land-grabbing' particularly of beach areas all around the country.

Chumbe Island presented a unique opportunity for establishing a small no-take ecological marine reserve. Failure of earlier attempts of establishing parks and the low political priority marine conservation had at that time, gave birth to the Chumbe MPA as a private initiative. In a race against time, the project initiator proposed to the Zanzibar investment agency that Chumbe Island should become a park, and a lengthy process of negotiations ensued involving altogether seven government departments. Finally, in 1992, a private company, Chumbe Island Coral Park Ltd. (CHICOP) was registered for park management.

Legal base for the private MPA
In the early nineties, Zanzibar had no policy and legal framework for conservation nor management institutions. The 1986 Zanzibar Investment Act invited private investment in tourism, thus providing an opportunity for investing in conservation. In the absence of more explicit legislation, the 1988 Zanzibar Fisheries Act provided sufficient basis for gazettement of the Chumbe MPA. Based on this, and the lease of a plot on Chumbe island, Management agreements were signed between CHICOP and the Ministry of Agriculture, Livestock and Natural Resources in 1994/1995. However, critical issues remain for investment in conservation.

Investment policy and regulations
The official tourism policy in Zanzibar emphasizes Eco-tourism, but this has not yet been fully translated into a legal and regulatory framework for environmentally friendly investment in the sector. Investment and building regulations give preference to multi-million dollar concrete buildings and infrastructure, and discourage small and medium-sized low-input projects and building designs. For example, non-permanent tented camps and palm-thatched roofs popular in game parks in Kenya and mainland Tanzania are not allowed in Zanzibar.

New environmental legislation sending mixed signals
The Zanzibar Environmental Management for Sustainable Development Act (1996) passed thereafter provides for a comprehensive legal and institutional framework for conservation and environmental management. The Act offers some incentives for private investment in conservation and environmentally friendly technology, such as tax incentives and the option that management of parks can be entrusted to private entities. However, other provisions of the Act weaken contractual security and thus increase long-term risks to private investment. So far, the Act has not been implemented, and the institutional setup and regulations are yet to be established and formulated.

Limited security of tenure
Investment security is also limited by the fact that land tenure in Tanzania and Zanzibar is only available on leasehold, in contrast to other African countries, such as South Africa, Namibia, Botswana, Kenya, that allow freehold and have attracted considerable private investment in parks (Watkins et al., 1996). In addition, land leases issued under the Zanzibar Investment Protection Act (1986) can be revoked by the State with relative ease, thus further weakening long-term security of tenure.

No tax and other incentives for investing in environment
Lack of security of tenure could be offset to a certain degree for small investments, by legal provisions that offer special incentives for investment in environment and conservation, such as long-term land lease and management rights, tax exemptions or reduced rates for land rents, licenses and fees. However, these are not readily granted.

Second tier constraints
When dealing with government, investors meet cumbersome bureaucratic requirements, ambiguous regulations and wide discretionary powers of civil servants, particularly concerning investment approval, land lease, building permits, immigration and labour regulations, taxes, fees and licenses (Rauth 1997). This encourages rent-seeking and delays operations, thus increasing investment insecurity

and costs, and creating obstacles particularly for small and medium investments and for innovative and environmentally-friendly project designs.

Hurdles to non-governmental initiatives
Non-governmental initiatives in conservation were not encouraged in Zanzibar until recently. Legislation for the registration of NGOs was enacted in 1995. However, provisions facilitating government intervention, supervision and de-registration are considered hostile by the NGO sector and still under public debate.

3.3. Project finances, cost control, marketing and sustainability

Project finances
The overall investment from 1991 was around 1 Million US$. About two thirds were financed by the project initiator (conservationist and former manager of donor-funded aid projects), while small grants from a variety of donors covered and continue supporting several non-commercial project components. These include the construction of the Visitors' Centre, biological baseline surveys, Rat eradication program, Aders' duikers sanctuary, the park rangers patrol boats, nature trails and the school excursion program, funded by GTZ-GATE, GTZ-EM, German Tropical Forest Stamp Program, EC-Microprojects, International School Schloss Buchhof, Munich, Netherlands Embassies in Kenya and Tanzania, WWF-Tanzania, Zoo Munich-Hellabrunn, Chicago Zoological Society, SADC-Environmental Education Program and the US-National Fish and Wildlife Foundation (NFWF) among others. More than 40 volunteers from several countries provided, and continue to provide, crucial professional support for between one month to three years.

Increased costs due to delays and red tape
The original feasibility study of 1991 provided for an investment of little more than US $200,000 in order to establish the park, a visitors' centre and 10 guest bungalows. However, unexpectedly three years had to be spent in negotiating the official gazettement of the park, the several management contracts, land lease, licenses and building, research, work and residence permits. Thus, the feasibility study had to be updated in 1994 based on an adjusted project design and more realistic investment costs, resulting in more than five times the original investment.

Going up-market due to increased investment costs
Commercial operations started in 1998. The increased investment costs obliged CHICOP to revise the price structure for tourist operations towards the higher end market, doubling overnight rates. An economic analysis in 1998 (Neckenig 1998) concluded that a net, all-inclusive overnight price of US$200 per person and an occupancy rate of 41% were needed to reach the break-even-point for running costs, excluding the grant component of project costs.

Costly logistics, sophisticated eco-technology
The logistical requirements of building on an island, the innovative technology for water and energy provision and the commitment to minimise degradation of the island environment also increased costs. A compost toilet, for example, that operates without producing any sewerage, costs about five times the price of a flush toilet. Water, sand, timber for the building operations and firewood for cooking staff meals were purchased and transported to the island at a high cost.

Though much of the eco-technology on the market today appears simple and unsophisticated by industrial country standards, devices have often not been tested under tropical and developing country conditions. Therefore, costs of adjustment, maintenance and replacement proved considerable.

The lesson learned here was that technical equipment needs to be simple, appropriate, low cost to purchase and easy to maintain under Third World conditions. This may mean 'outdated' equipment by international standards. It proved cost-effective in many cases to acquire secondhand equipment that was still operational and had a life span that could be extended by local technicians. New and sophisticated equipment is costly and breaks down easily in an environment of tropical temperatures, power fluctuations and blackouts, unskilled users and lack of maintenance staff and spare parts. In Tanzania as elsewhere, labour costs are low and spare parts expensive to import for sophisticated gear. Low cost alternatives are available on local informal (street) markets, and roadside fitters and technicians are very creative in fixing things that are considered scrap elsewhere.

The private sector has an important cost advantage here over donor supported projects that are commonly bound by regulations to import the latest and more sophisticated equipment. The technology choice of going local and to the informal markets has an added advantage: it provides employment and income to local people.

Strict control of operational costs and overheads
By necessity, the Chumbe team kept the project afloat with cost-conscious management, despite project delays, increased costs, a fluctuating occupancy rate and the continuing burden of government licenses, fees and taxes. Measures of strict cost control include mobilising donor support for equipment and activities, recruiting volunteers for professional assistance, continued co-operation with local and international NGOs for some activities, e.g. the educational program, and with zoos and international conservation organisations for the establishment of protected species sanctuaries, outsourcing research and species monitoring to university-supported degree students, and keeping some non-key staff on part-time or flexible employment schedule to respond to peak seasons. Limiting factors include difficulties to get work permits, the rigid labour legislation and the high investment needed in staff training.

Aggressive marketing
Another lesson learned is the need for aggressive marketing. Conventional marketing methods, such as advertising in the media and participation in travel fairs, are too costly for small projects and also not effective in targeting the ecotourism niche market. Therefore, CHICOP opted for a different strategy that included gaining recognition by the international conservation community, winning international environmental awards and targeted marketing over the Internet.

Recognition by the International conservation community
Chumbe Island is registered with the World Conservation Monitoring Center (WCMC) from 1995, and joined the International Coral Reef Initiative (ICRI), discussing management experiences at international conferences and workshops. Chumbe also sparked off a lively debate on private park management and sustainable

tourism investments in the UNESCO sponsored Internet discussion forum on coastal zone management, www.CSIwisepractices.org,

International Environmental Awards
Environmental awards proved to be a powerful promotional tool that attracts media coverage, travel writers and TV documentaries. CHICOP gained selection as a Worldwide Project at the EXPO2000 World Exhibition in Hanover/Germany and represented Tanzania there. Other prestigious international awards include 1999 British Airways Tourism for Tomorrow Global Award, 2000 UNEP Global500 Award, 2001 Environmental Award of the International Hotel and Restaurant Association (IH&RA).

Marketing through the Internet
Marketing is mainly done over the Internet, also stressing the conservation orientation of the project, gaining the project top ranking with nearly 1000 links.

Volatile tourism market
Surviving without subsidies is no minor achievement for a park, considering that the tourism industry is particularly volatile and sensitive to political turmoil (often associated with election periods), adverse weather conditions (el Niño) and perceived security and health risks. Over the last three years, East Africa as a whole had more than its fair share of these problems, with an immediate, and sometimes drastic decline in tourist arrivals. Riots in Zanzibar during election times in 2000 and in early 2001, as well as the latest worldwide events have resulted in cancellations and low occupancy rates.

4. Getting the private sector on board for effective marine conservation

4.1. What the private sector can offer

The tourism sector has a stake in coral reef conservation
Resort managers and dive operators often have a strong interest in coral reefs and can become partners in their conservation and sustainable management. Marine tourists are increasingly environmentally aware, demand and acknowledge such commitment, particularly when a country markets itself as a nature destination.

Tourism operations have played a leading role in coral reef conservation in Tanzania. Little was done for decades to combat dynamite fishing along the coast, until a tourist hotel in Dar es Salaam, fearing for the safety of its diving clientele, initiated a press campaign using strongly-worded letters from former guests in 1997. As the country's image as an emerging tourist destination was at stake, this for the first time generated enough political will to take action. The navy was summoned and succeeded in reducing dynamite fishing at least along the reefs closer to shore. As a welcome side effect, this also increased political support for donor-funded regional projects working with fishing communities in Mtwara (Luhikula, 1999) and Tanga regions (Horrill & Makoloweka, 1998).

Marine tourism raises economic value and feelings of ownership of coral reefs
Marine and dive tourism can dramatically increase the economic value of coral reefs with non-consumptive use. Managed properly, fishers and other resource users can

benefit, and are likely to develop greater appreciation and feelings of ownership of coral reefs that were traditionally believed to be inexhaustible (Scheinman and Mabrook, 1996). It is our experience that the realization that coral reefs are only found in the tropics and do attract international tourists is quite an eye opener for local people in Zanzibar.

Attract local investors
The marine tourism market may attract local investors with little previous knowledge of and interest in marine resources and coral reefs, and thus increase political support for conservation. In Tanzania for example, where the recreational preferences of urban elites do not include marine sports, and swimming is not considered a useful skill, attitudes are now beginning to change with the growing tourism industry.

Deal with direct stakeholders
Private organisations have a lot to offer for effective management of small no-take MPAs that have a tourism potential. People involved in tourism and fisheries are direct stakeholders in a particular area and depend on the same resource. Both groups share a potential interest in sustainable resource use, and have thus strong incentives for effective communication and direct participation on issues related to the management and conservation on-site. This is in contrast to non-representative management authorities where external funding sometimes creates incentives for high overhead costs that may alienate direct stakeholders (Andrews 1998).

Involve artisan fishers
Dealing directly with artisanal fishers in specific parks facilitates consensus building, particularly where they share interests and can derive clear benefits from conserving that area, e.g. increased catches in adjacent areas. In many countries, traditional subsistence fishers are among the poorest sections of the society, with low social status and limited access to a career in the civil service. They find it easier to co-operate with park rangers who have been fishers themselves and whom they helped recruit. Park management that is responsive to the local fisher's needs, e.g. by providing marine rescue services, is also more acceptable. While civil service regulations and modes of operation make it difficult for governments to, for example, employ local fishers with little formal education as rangers, the private sector can respond more flexibly to demands of local communities for involvement in park management.

Help winning support from local communities
Village meetings and media campaigns, guided environmental excursions, on-site education of fishers by park rangers, advisory committees and management plans that involve stakeholders, are effective ways of building support for a MPA. Public education, particularly through the school system also helps build ownership. However, local communities typically include a variety of interest groups that are divided over issues of conservation and environmental management. Therefore, the process of consensus building is commonly cumbersome and time-consuming. The private sector cannot bear all costs, but must be made integral part of negotiations. Government and civil society support are essential and International conservation and donor organizations can play an important role here.

Upgrade indigenous knowledge

Training local fishers as park rangers, to guide visitors and to communicate with fellow fishers does provide an enormous opportunity to learn about both the wealth and the limitations of local traditional knowledge about coral reefs. Acknowledging the wealth and overcoming the limitations is what the rangers' training and educational work is all about. Again, the flexibility of the private sector for employing local people allows to take full advantage of this valuable resource.

Capacity building and institutional strengthening
For conservation achievements on the ground, a small private management body has comparative advantages over large central management authorities. Local people participate and benefit more directly, when local fishers are trained as park rangers to deal with local communities, employment is offered to them, and when school-children and ecotourists are offered environmental education. The investment negotiations involved in setting up parks and for management agreements help create awareness among political leaders and civil servants about the legal, financial and institutional requirements of conservation and ecotourism.

Sustainability and long-term benefits
There are clear long-term benefits when a private sector institution establishes and manages small MPAs, for effective resource protection, economics, capacity building and environmental awareness. Committed enforcement that does not depend on external funding can help restock over-fished and depleted reefs adjacent to parks, generate management funds and alternative income for local people through tourism, train and create awareness among stakeholders on the requirements and benefits of conservation and sustainable management.

Strong incentives for effective and cost-conscious operations
Last but not least, private management has stronger incentives to achieve conservation on the ground, keep overheads down and generate income than government-controlled and externally funded management bodies.

4.2. What the private sector would ask for

Genuine direct stakeholders to be taken seriously
The direct users of coral reefs, such as traditional and non-traditional fishers and tourism operators, may have conflicting interests, but they have ultimately a direct shared interest in an area, and a potential interest in its conservation. Local fishing communities respond to similar economic motives as the private sector and form an integral part of this sector.

Acknowledge that artisan fishers also respond to market incentives
Traditional resource users may have a close relationship to the natural environment and an innate sense of balance in their exploitation of these resources. However, it should not be assumed that traditional fishers have a greater incentive to protect their resource base than modern sector resource users.

In Tanzania, while the fisheries sector still appears dominated by traditional artisanal or subsistence fishers, many fishing activities supply highly organized far-reaching trade networks to national and international markets. Civil servants and business people finance and participate in this trade, may operate 'dynamite' boats to distant

reefs, provide explosives to local fishers and buy their produce (Guard, 1997). Dried sardines (dagaa) from the lakes and the coast are traded as staple food all over the country (Gibbons, 1997), sea cucumbers are collected for export to Asian markets (Semesi et al., 1998), and lobsters are increasingly over-harvested for the growing tourism industry (Bakari & Andersson, 1998). Most of these trade networks belong to the informal economy and may not appear in trade statistics, but form a highly organised part of the private sector that responds to market incentives.

Acknowledge governments and donor agencies as stakeholders with institutional interests

It is commonly assumed that governments would mediate between competing interests. However, in highly donor-dependent countries such as Tanzania, both donor and NGO interests and various forces within the governmental bureaucracy, itself, may well prevail over the interests of direct resource users. Donor agencies are under pressure to spend allocated aid money within a set time frame, and international and local NGOs and government institutions may compete for these funds to sustain their operations. Such institutional interests may provide incentives to increase the weight and complexity of the bureaucracy in order to justify continued funding. This may inhibit the effective conservation and sustainable resource management on the ground and alienate direct stakeholders (Andrews 1998).

Scrutinize NGOs more closely

Where central governments are perceived as inefficient, undemocratic and unaccountable, external support for environmental and conservation projects is increasingly channeled to non-governmental organisations (NGOs). However, what is often overlooked is that NGOs are not accountable by definition or through the mere act of registration. Public control and political will, appropriate legislation and supervisory bodies are required to ensure that NGOs actually fulfil their mandated work and use their funds effectively. In Tanzania as elsewhere, the lack of public supervision of NGO activities encourages the formation of briefcase organisations. And where, as in Tanzania, the tax legislation provides few incentives for charitable contributions of individuals and business organisations, there is also a risk of NGOs being formed mainly for access to external funding, rather than for stewardship for environmental and community interests. This situation undermines transparency and accountability to the intended beneficiaries, e.g. local people in marine conservation projects through NGOs.

Acknowledge commercial risks

The Chumbe case demonstrates that private commitment to and investment in conservation on the African continent as well as in other developing countries can pose a high commercial risk, mainly due to a poor investment climate. In addition, conservation programs in Sub-Saharan Africa often depend on donor funding and do not require income from tourism and other sustainable uses. Though 'sustainability' is now demanded for aid project designs, the prevailing spending pressure crowds out conservation-oriented investors who cannot compete in a climate where park management is funded by external grants that sometimes tolerate the high overheads of state-run institutions. This situation perpetuates a systematic cycle of non-sustainability in the economic management of the resources (Cairncross, 1991).

Conducive investment climate crucial

In summary, an attractive investment policy would have to address issues of good governance, security of tenure, contractual and legal framework, financial services, as well as incentives concerning land rent, taxes, fees and licenses. A favourable policy framework is only the start of the process. Second-tier constraints created by ambiguous regulations and wide discretionary powers of civil servants have to be removed, particularly concerning land leases, building permits, immigration and labour laws and regulations. (Rauth 1997) And last but not least, the investment climate for conservation would be improved by an official acknowledgment that making profits from conservation is not morally bad, but a condition of sustainabiliy. Particularly in former socialist states, a change of attitudes in this respect needs proactive government support.

Environmental certification

It is sometimes suggested that tourism operations need to be controlled and regulated to adhere to minimum environmental standards (Colwell 1999). However, this assumes a framework of good governance that is not yet the reality in many parts of the world. A more powerful tool is international environmental certification, for example, that has high marketing value in tourism source markets. This gives stronger incentives to owners and operators to adopt ecological principles in building designs and recreational activities, than inspection visits of sometimes rent-seeking government officials. ISO 14001-certification and prestigious awards such as the British Airways Tourism for Tomorrow Award among others provide valuable marketing publicity.

International insurance scheme for MPAs proposed to buffer market risks

The most serious threat to economic sustainability of privately managed conservation projects are their dependence on international tourism for income generation, a market that is sensitive to political turmoil and perceived security and health risks. Such risks could be reduced by an international insurance scheme that buffers privately managed and other sustainable parks against severe income loss from visitor fluctuations.

5. Conclusions

The common perception in donor discourse, of the private sector as being located outside and antagonistic to a sometimes romanticised 'local community' is not helpful for understanding stakeholder interests in coral reef management. Though traditional fisheries and the harvesting of reef resources may belong to the informal sector of the economy in many countries, these are also economic activities that are sometimes highly commercialised. Ignoring this reality does not help in the identification of genuine stakeholders.

Viable partnerships for the management of a particular park are more likely when local communities, traditional fishers and tourism operators are acknowledged as belonging to the (formal and informal) private sector that responds to similar economic incentives. Small-scale fishers, shell collectors and seaweed farmers who depend on reef resources for their survival, may have more common interests with local tourism and dive operators than with central government agencies and foreign-funded NGOs.

For sustainability of their economic activities, tourism operators, fishers and other resource users have potential interest in coral reef management. Involving them in conservation projects and park management is likely to raise their awareness in this respect. Outside support would still be required, particularly where threats to coral reefs originate from distant areas, such as logging, siltation and large-scale infrastructure developments (World Bank, 1999).

It is suggested that the international conservation and donor community would improve the impact of their investment in coral reef conservation if project designs focused more on direct resource users and stakeholders in a particular area, who have long-term economic incentives to co-operate. This may include support to private management, particularly where small no-take MPAs are created. These have the potential of providing fish refuges, larval sources and suitable settlement areas, by which adjacent fishing areas are eventually replenished with marine species through reproduction or migration. Such well managed small MPAs may become the core of large, multiple use MPAs and free access areas.

Support to private initiatives may help alleviate the commercial risks of long-term investment in conservation and integrate a wider range of stakeholders in coastal zone management, and thus improve local political support to MPAs. Last but not least, donor support for policy reforms that improve security of tenure and the investment climate in general may also encourage private investment in better environmental practices and conservation.

NOTE

This paper is a revised version of an earlier paper presented to the Regional Workshop for the Indian Ocean of the International Coral Reef Initiative ICRI, Coral Reef Degradation in the Indian Ocean (CORDIO), International Coral Reef Action Network ICRAN/UNEP-Regional Coordination Unit RCU, Maputo/Mozambique November 26-28, 2001.

REFERENCES

Andrews, G. (1998), "Mafia Island Marine Park, Tanzania, Implications of Applying a Marine Park Paradigm in a Developing Country", Paper presented at the International Tropical Marine Ecosystem Management Symposium (ITMEMS), Townsville, 23-26 November.

Bakari, R. and J. Andersson (1998), "Economic Liberalization and Its Effect on the Exploitation of Crustaceans in Tanzania", AMBIO, Vol.27, No.8.

Beentje, H.J. (1990), A Reconnaissance Survey of Zanzibar Forests and Coastal Thicket, Finnida-Cole, Zanzibar

Cairncross F. (1991), Costing the Earth: the Challenge for Governments, the Opportunities for Business, Harvard Business School Press, Boston.

Bruner, A.G et.al. (2001), Effectiveness of Parks in Protecting Tropical Biodiversity, Science, Vol.291, 5 January 2001

Carter, E., Nyange, O., and Y. Said (1997), "Management Experiences of the Chumbe Reef Sanctuary 1992-1996", Paper presented at the National Coral Reef Conference, Zanzibar, 2-4 December.

CHICOP - Chumbe Island Coral Park (1995), Management Plan 1995-2005, Zanzibar

CHICOP - Chumbe Island Coral Park (1999), Progress Report 1992-1999, Zanzibar

Colwell, S., (1999), "Entrepreneurial MPAs: Dive Resorts as Managers of Coral Reef Marine Protected Areas", InterCoast Newsletter, Coastal Resources Center, University of Rhode Island, No.34.
Dixon, J. and A. and P.B. Sherman (1990), Economics of Protected Areas: A New Look at Benefits and Costs, Island Press, Washington DC.
Fiebig, S. (1995), "Fish Species List and Management Report on the Chumbe Reef Sanctuary".
Guard, M. (1997), "Dynamite Fishing in Southern Tanzania", Miombo 17, Wildlife Conserv. Soc. of Tanzania, Dar es Salaam
Gibbons, P. (1997), The Poor Relation. A political economy of the marketing chain for dagaa in Tanzania, CDR Working Paper, Centre for Development Research, Copenhagen, Denmark
Horrill, C. (1992), "Status and Issues Affecting the Marine Resources Around Fumba Peninsula", COLE-Zanzibar Environmental Study Series, No. 12.
Horrill C. and S. Makoloweka (1998), "Silencing the Dynamite Fisheries along the Tanga Coast, Tanzania", Paper presented at the ICRI-International Tropical Marine Ecosystems Management Symposium, (ITMEMS) November 23-26, Townsville, Australia.
Iles, D.B. (1995), "Roseate Terns", Miombo, No.13, July 1995, Wildlife Conservation Society of Tanz., Dar es Salaam
Jameson, S.C., Mcmanus, J.W., and M.D. Spalding (1995), "State of the Reefs, Regional and Global Perspectives", An International Coral Reef Initiative Executive Secretariat Background Paper.
Kingdon, J. (1997), The Kingdon Field Guide to African Mammals, Academic Press.Luhikula, G. (1999), "Community Participatory Approach Pays Dividends in Fight Against Dynamite Fishing", InterCoast Network Newsletter, Coastal Resources Center, University of Rhode Island, Narragansett, USA, No. 34.
Moffat D., Ngoile, M., Linden, O., and J. Francis (1998), "The Reality of the Stomach: Coastal Management at the Local Level in Eastern Africa", AMBIO, Vol.27, No.8.
Neckenig, H (1998), "Chumbe Island Coral Park, A Viability Study", CHICOP, Zanzibar.
Olsen S. B., Tobey J and L.Z. Hale, "A Learning-Based Approach to Coastal Management", AMBIO, Vol.27 No.8.
Rauth, R. (1997), "Bureaucracy Killing Business in Africa", Financial Times, April 23-29.
Riedmiller, S. (1991), "Environmental Education in Zanzibar: Proposals for Action", Dept. of Environment, Finnida, Zanzibar
Riedmiller, S. and B. Cooksey (1995), "Science Teaching in Government Secondary Schools in Mainland Tanzania - A Situational Analysis", Consultancy Report, GTZ-University of Dar es Salaam
Riedmiller, S. (1998), :The Chumbe Island Coral Park Project, A Case Study of Private Management of a Marine Protected Area", Paper presented at IUCN-Regional Workshop on Marine Protected Areas, Tourism and Communities, May 11-13, Mombasa
Riedmiller, S. (1998), "The Chumbe Island Coral Park Project, Management Experiences Of A Private Marine Conservation Project, Paper presented at the ICRI-International Tropical Marine Ecosystems Management Symposium (ITMEMS), November 23-26, Townsville, Australia

Riedmiller, S. (1999), "The Chumbe Island Coral Park: A Private Marine Conservation Project", InterCoast Network Newsletter, Coastal Resources Center, University of Rhode Island, No. 34.
Scheinman, D. & A. Mabrook (1996), "The Traditional Management of Coastal Resources", Tanga Coastal Zone Conservation and Development Programme, Tanga, Tanzania.
Semesi A., Mgaya Y.D., Muruke M.H.S., Frances J., Mtolera M., and G. Msumi (1998), "Coastal Resources Utilization and Conservation Issues in Bagamoyo, Tanzania", AMBIO, Vol.27, No.8.
Sterner, T. and J. Andersson (1998), "Private Protection of the Marine Environment, Tanzania: A Case Study", AMBIO, Vol.27, No.8.
Tobisson E., Andersson J., Ngazi Z., Rydberg L., and U. Cederloef (1998), "Tides, Monsoons and Seabed: Local Knowledge and Practice in Chwaka Bay, Zanzibar", AMBIO, Vol.27, No.8.
UNEP-RSRS, (1989), "Coastal and Marine Environmental Problems of the United Republic of Tanzania", UNEP Regional Seas Reports and Studies, No.106.
Watkins, C.W., Barrett, M., and J.R. Paine (1996), "Private Protected Areas, A Preliminary Study of Private Initiatives to Conserve Biodiversity in Selected African Countries", World Conservation Monitoring Centre (WCMC), Cambridge.
World Bank (1999), "Voices from the Village, A Comparative study of Coastal Resource Management in the Pacific Islands, Summary Report, Pacific Islands Discussion Paper Series No.9A, East Asia and Pacific Region.