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Sustainable Management of Mangrove Resources through a Participatory Approach – Kenya

IOI Operational Centre Involved: IOI-Eastern Africa, located at the Kenya Marine and Fisheries Research Institute, Mombasa, Kenya

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SUMMARY

The project is located on Gazi Bay, Msambweni District, on the south coast of Kenya. On the landward side, Gazi Bay is bordered by 615 ha of mangrove forests. As in many sites along the Kenyan coast, mangrove deforestation has been widespread in Gazi. The loss of mangroves has affected the local economy as indicated by shortages of building poles and firewood, decreased fishery resources and increased coastal erosion.

The main thrust of the current project is to conserve mangroves and thereby provide tangible benefits to the village communities engaged in the conservation. Project activities include mangrove reforestation, ecotourism activities, beekeeping and integrated aquaculture. To date, 100 ha of degraded mangrove areas in Gazi have been reforested with suitable species. A mangrove boardwalk about 350 metres long, together with fishponds for milkfish farming, has also been constructed for ecotourism.

This is a multi-phase conservation and development project on mangrove forests. The current phase will last for five years, beginning from 2005. The project proponents are the Kenya Marine and Fisheries Research Institute and IOI-Eastern Africa in partnership with the Gazi community. Initial funding for the current phase of the project was received from the City Council of Overijse, Belgium (\$15,000); the IOI Women, Youth and the Sea Programme (\$15,000); the Western Indian Ocean Marine Association (\$6,000); and the WWF-Critical Ecosystem Partnership Fund (\$5,000).

BACKGROUND AND JUSTIFICATION

Gazi Bay has a surface area of 18 sq km and is sheltered from strong sea waves by the presence of Chale Peninsula to the east and a fringing coral reef to the south. There are two seasonal rivers feeding into Gazi Bay: Kidogoweni and Mkurumuji.

All 10 mangrove species in the Western Indian Ocean region occur in Gazi, the dominant ones being *Rhizophora mucronata*, *Ceriops tagal* and *Avicennia marina*. In addition to providing a range of products that people need, including building materials, firewood, tannins, fodder and traditional medicines, mangroves are of invaluable local and global ecological, economic and social importance. They serve as restaurants and runways for numerous species of fish, molluscs and crustaceans. Mangroves also filter sediments

(which threaten coral reefs with siltation) and help to control water quality.

Despite the recognized socio-economic and ecological values of mangroves worldwide, mangroves are threatened in Kenya by natural and human-induced stresses ranging from overexploitation of resources and conversion of mangrove areas for other land uses such as prawn culture and salt mining to pollution.

The village of Gazi is a strongly knit Muslim community led by an elected chairman. It is endowed with tourist sites such as historical places, coastal forests, beautiful beaches and impressive birdlife, most of which remain unexploited.

The Gazi pilot area has a resident population of 1,200, of whom 75 per cent live below the poverty line, earning less than \$1 per day. Unemployment is high in Gazi. Most people engage in more than one occupation in order to augment their earnings. The major occupations are fishing (60 per cent of the population), mangrove cutting (20 per cent) and retail trade (5 per cent) as well as boat repair, handicrafts and weaving of mats. A small percentage of the people in Gazi practise subsistence farming, cultivating maize, cassava, plantains, rainfed rice, cowpeas, tomatoes, pumpkins and watermelons. Farming has been made difficult owing to wild animals and the fact that farms are situated away from the homesteads, necessitating long walks to the fields.

With respect to community services and infrastructure, Gazi must be regarded as a poor village by all standards. About

70 per cent of the population is illiterate. The only primary school in the village lacks basic necessities such as adequate classrooms, furniture, textbooks and stationery. In addition, the school is overcrowded and understaffed. Access to health services is limited as the only government hospital is 15 km away in Msambweni. Water is obtained from public and private boreholes.

Given this background, there was an urgent need to conserve the mangrove forests and thus provide tangible benefits to the village communities. There was also justification for including ecotourism activities, beekeeping and integrated aquaculture in the project.

CHALLENGES ADDRESSED

The challenges addressed are as follows:

- livelihoods threatened by the loss of mangrove forests (reduction of income from fisheries and loss of employment);
- a shortage of fuel wood and building poles; and
- increased coastal erosion and sedimentation.

OBJECTIVES

The overall objective of the project is to improve the sustainable development and conservation of mangrove forests in order to enhance the productivity of natural

resources, particularly in ways that would sustain a continuous flow of desired forest products and services.

The specific objectives are to:

- improve understanding of the mangrove ecosystems in order to increase awareness of the importance of mangrove forests and the need for their conservation;
- establish demonstration projects on mangrove rehabilitation; and
- demonstrate the feasibility of reducing pressure on mangrove forests through the creation of alternative livelihood activities such as ecotourism, beekeeping, and integrated aquaculture.

PROJECT PLANNING

Given the variety of tasks and the multi-disciplinary and integrated nature of activities, the project is being implemented under the supervision of an implementation committee (PIC), chaired by the Project Coordinator at Kenya Marine and Fisheries Research Institute. IOI-Eastern Africa coordinates the training and extension programmes provided by relevant government agencies. These include the Kenya Forest Service and the Ministry of Agriculture, which provide training in forest management and beekeeping.

The PIC is made up of representatives from government departments and the community, who meet regularly to

review project progress. Its mandate includes the following:

- to ensure that the project is on schedule and that the costs incurred are in accordance with the agreed budget line;
- to approve the annual work plans and expenditures;
- to approve the terms of reference for all subcontractors;
- to select subcontractors for each activity; and
- to approve the key outputs such as management plans, awareness-raising materials and training modules.

PROJECT ACTIVITIES

In 2003, the City Council of Overljise in Belgium granted the community of Gazi \$15,000 through the Kenya Marine and Fisheries Research Institute for the implementation of a community-based mangrove ecotourism project in the village. The initial funds were used in constructing a 350-metre-long boardwalk



Signage for the opening of the boardwalk in the Gazi mangroves.

across the mangroves of Gazi as well as in making boardwalk brochures and erecting signboards. The boardwalk is now a big attraction for tourists, members of the public and school parties that visit Gazi.

In 2005, the IOI Women, Youth and the Sea Programme approved further support of \$15,000 for the installation of sanitary facilities as well as training of trainers involved in the project.

The project activities are as follows:

- participatory mapping of the mangroves;
- quantification of degraded mangrove areas;
- production and dissemination of awareness-raising materials;
- an educational trip to other mangrove projects;
- awareness-raising and training workshops;
- linkages with the mass media;
- development of livelihood projects;
- establishment of woodlots on private or communal lands;
- development of capacity to manage mangrove resources;
- assessment of the ecological settings of the degraded areas;
- identification of suitable mangrove species for reforestation;
- establishment of mangrove nurseries;
- participatory mangrove planting;
- establishment of a mangrove monitoring programme; and

- formulation of simple mangrove management plans.

Some activities such as mangrove rehabilitation are long term. Plantations established in the 1990s have already attained harvestable sizes.

ACHIEVEMENTS AND OUTCOMES

By early 2008, more than 100 ha of degraded mangroves had been reforested with suitable species. Most of the trees in the plantations are suitable for firewood and building. The project has therefore directly addressed the problems of firewood and building poles and has created job opportunities for youth employed to manage the plantations. Indirectly, it enhances fishery production and erosion control in the pilot area. The total economic value of replanted mangroves in Gazi has been estimated at \$3,000/ha/yr, with the highest value being that of shoreline protection.

The outcomes are the following:

- The mangroves of Gazi have been mapped using high-scale remotely sensed data.
- The major causes of mangrove degradation in Kenya have been identified. These include overharvesting of mangrove wood products, conversion of mangrove areas for other land uses, pollution and shoreline changes.
- Awareness-raising materials such as brochures, posters and videos have been developed and distributed. Through awareness-raising programmes, the local community has been sensitized to the important roles played by mangroves in ensuring the community's livelihood security in an ecologically sustainable manner.
- Public awareness and community understanding of the importance of and the need for mangrove conservation and management have been enhanced.
- Activities relating to alternative livelihoods have been identified and initiated.
- Degraded mangrove forests have been rehabilitated through community participation. Some of the plantations established have reached harvestable size.
- Community-based mangrove management plans for Gazi have been developed and are operational.
- A 350-metre boardwalk, constructed across the mangroves of Gazi, is now a major attraction for both tourists and school parties. Fees are charged to residents and non-residents visiting the boardwalk. Now the local community in Gazi can benefit directly from mangrove ecotourism activities in terms of direct employment and revenue.

MONITORING AND EVALUATION

The project is subjected to the Kenya Marine and Fisheries Research Institute standard monitoring and evaluation procedures for demonstration projects. Annual project reports are prepared and submitted to the Institute as well as to project stakeholders. The reports contain a summary of progress achieved since the previous reporting as well as accounts of any foreseen impediments to project implementation and actions taken for their remediation.

STRENGTHS AND WEAKNESSES

The strength of this project lies in its participatory design and implementation. The project approach is pro-nature, pro-poor and pro-women. From the very beginning, the project has been implemented with the consent, support, cooperation and participation of the local community. The livelihood programmes established in the course of the project have impacted positively on the communities in Gazi in terms of job creation and the provision of firewood and building poles.

There are weaknesses in the project, however. Amid poverty and a high level of illiteracy, it is a daunting task to sell conservation concepts to people. The fisherfolk and mangrove cutters in Gazi know very little about the role played by mangrove wetlands in maintaining

their ecological and economic security. This leads to overexploitation of the mangrove resources and degradation of the habitat. Most of the communities are interested in short-term gains rather than in waiting for replanted trees to mature. There is very little understanding of the true value of the mangrove environment.

PARTNERSHIPS

This project is a good example of a successful partnership programme between the government agency, the non-governmental organization (NGO), the local community and the donors. The following are government partners in the project:

- *Kenya Marine and Fisheries Research Institute.* This is a national research institute that was established by an act of parliament in 1979. It is mandated to carry out research and advise the Government on the wise uses of aquatic resources, including mangroves. Under the present project, the Institute is the lead government agency for overseeing the successful implementation of the project activities.
- *Kenya Forest Service.* The Kenya Forest Service was established in 2005 as an autonomous government institution to take over the role of the Forest Department in the Ministry of Environment and Natural Resources. It is thus the lead government agency responsible for all forest management in the country, including mangroves.

The role of the Service in the present project is to provide guidelines on the management of mangrove forests.

- *Kenya Wildlife Service.* The Kenya Wildlife Service was established in 1990 under the Wildlife Conservation and Management Act of Kenya. It is responsible for the protection, conservation and management of marine and terrestrial parks and reserves, some of which contain mangroves. In the pilot area, the Government of Kenya has designated the seascape between Challe Island and Gazi as a marine protected area. For the present project, the Kenya Wildlife Service guides the wise exploitation of marine resources in the pilot area.
- *Fisheries Department.* Established in 1954, the Fisheries Department is mandated to undertake the management and development of fisheries in Kenya. Primary regulatory problems within and outside mangrove areas include use of poor fishing gear, such as undersized nets. For this project, the Fisheries Department provides technical backup to aquaculture activities.
- *East African Wild Life Society.* Through advocacy and education campaigns, the Society has sensitized the public to the threats of industrial aquaculture in the mangrove areas and instead promoted community-based, integrated aquaculture development.
- *Wildlife Clubs of Kenya.* These clubs target the youth in promoting environmental education to schools and colleges. In the project area, Wildlife Clubs of Kenya is actively involved in mangrove conservation through the organization of exchange tours, essay-writing competitions and youth rallies.
- *Kenya Forests Working Group.* This is an inter-institutional task force campaigning against forest excision by the government. Although most of the task force activities have been concerned with terrestrial forests, the role of the Working Group in the current project is to sensitize people to the problems of mangrove deforestation.

Alongside the government efforts, local NGOs have played an important role in mangrove conservation in Kenya in line with government policies. NGO partners in the current project include the following:

The net beneficiaries of the project are the local communities of the pilot area, which provide materials and labour for the project. For instance, during the construction of the boardwalk, competitive tendering was conducted at the community level in which members of the village were invited to supply essential materials for the project, including timber and poles. In this way, most of the donor money is circulated within the community.

INNOVATIONS AND REPLICABILITY

This project demonstrates a comprehensive participatory approach to the integrated management of mangrove resources in Kenya. For example, in the rehabilitation of degraded mangrove areas in Gazi Bay, the project has explored innovative economic incentives for community-based management of natural resources, such as initiating bee farming, ecotourism activities and integrated aquaculture as well as promoting farm forestry in the area. The project activities involve raising awareness, training and participatory monitoring of mangrove forests. Through these activities, the project addresses problems that are common to other mangrove areas in the country. As such, it is both innovative and replicable. The project output will be very helpful to the formulation of integrated mangrove management plans not only in Kenya but also in other countries in the region.

SUSTAINABILITY

The Government of Kenya has expressed a commitment to the conservation and sustainable use of mangrove forest resources, as detailed in the National Environmental Action Plan, the National Integrated Coastal Zone Management Framework, and the revised Forest Act that declares all mangroves in Kenya as gazetted forests. The series of workshops, surveys and community-based

mangrove plantation trials conducted by the Kenya Marine and Fisheries Research Institute have demonstrated sustained interest and involvement by government and local communities in mangrove forest management.

The project design is participatory and multisectoral, involving a number of government departments as well as local communities and NGOs. The project builds and strengthens the existing institutions; no new institutions or institutional frameworks are being created. There are no large-scale infrastructure or investment costs.

Capacity-building, especially the involvement of local people, will ensure sustained conservation of mangrove forests even after the end of the project. Increased awareness will encourage the local community to make a deliberate attempt to manage mangrove forests sustainably since the community appreciates their benefits. The alternative livelihoods established under this project are self-sustaining. Continued monitoring of the established plantations and livelihoods has been factored into the research activities of the Kenya Marine and Fisheries Research Institute so that continued technical support to the local people is guaranteed.

DIFFICULTIES AND LESSONS

Mangrove forestry in Kenya is constrained by the following:

- *inadequate baseline data.* Although many surveys have been done on Kenya's mangroves, data to support the formulation of a management plan are still inadequate. Data on growth rate, standing biomass/volume and phenology are crucial to management. The area of mangroves also is not accurately known in the country, with different organizations providing different figures;
- *conflicting policies* regarding the management of mangrove resources;
- *inadequate resources* in the institutions mandated to manage mangroves in the country. The Forest Department has insufficient resources in terms of finance, vehicles, boats, equipment and tools to manage the country's mangroves effectively;
- *lack of community education* on the true values of mangroves;
- *poor remuneration* for the staff assigned to manage the country's forests. The low salaries lead to corrupt deals such as allowing illegal logging;
- *lack of institutional coordination.* A large number of mangrove stakeholders exist in Kenya and some of their mandates with regard to mangrove management are conflicting; and
- *inability to internalize* all the benefits accruing from mangrove reforestation.

FUTURE PLANS

Several activities are planned for this project in the future. In view of the aim of enhancing community participation in issues of mangrove management, it is necessary to encourage joint mangrove management with other stakeholders, including the participation of NGOs and local communities, so that shared management responsibilities can be implemented.

Other planned activities are as follows:

- identification of degraded parts of mangrove areas for future rehabilitation;
- identification of reference mangrove sites within the pilot area where access will be restricted. Such sites will be essential to providing long-term data on mangrove growth and development. Already-reforested sites in Gazi have been recommended for Permanent Sample Points by the Kenya Forest Service;
- in view of the need for coordinated management of the mangrove ecosystem in the pilot area and other parts of Kenya, possible formation of a steering committee comprising expertise from the Fisheries Department, the Kenya Forest Service, the Kenya Marine and Fisheries Research Institute, the Kenya Wildlife Service and other stakeholders to provide advice to the Director of Forests;

- development of a management plan for the mangroves of Kenya. Local communities will be involved in the initial planning and implementation of the plan;
- participatory reforestation of degraded mangrove areas of Gazi; and
- preparation of mangrove educational materials for circulation through schools and colleges.

POLICY IMPLICATIONS

It is widely recognized that lack of community participation is to blame for mangrove degradation in many parts of the world. This is owing mostly to inadequate knowledge of the value of goods and services provided by mangroves. For example, the value of mangroves with regard to fisheries is five times greater than the value when the same forest is cleared for wood products. Most of the value of mangroves to fisheries, however, is difficult to internalize as the fish breeding in mangrove areas are caught away from the areas. It is therefore essential for management agencies to apply the ecosystem-based approach in the management of mangrove areas in Kenya.

Decision 5 adopted by the Conference of the Parties to the Convention on Biological Diversity at its fifth meeting, held in Nairobi from 15 to 26 May 2000, contains the following definition of "ecosystem approach": "a strategy for the integrated management of land, water

and living resources that promotes conservation and sustainable use in an equitable way". This approach places human needs at the centre of biodiversity management. It aims to manage the ecosystem based on the multiple functions that ecosystems perform and the multiple uses that are made of these functions. The ecosystem approach does not aim for short-term economic gains but rather to optimize the use of an ecosystem without damaging it.

In the Gazi project, the aims are to improve people's livelihoods though income generated by alternative occupations such as mangrove ecotourism and aquaculture as well as to protect the habitat for fisheries. Such an integrated approach to mangrove management has been given emphasis in the current Forest Act in Kenya. Since sustainable use of mangrove goods and services is a vital way of mitigating impacts of climate change and contributing to human development, there is a need for government to create a trust fund that will support community efforts in mangrove conservation.

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