




UNITED NATIONS DEVELOPMENT PROGRAMME
Project of the Government of India
Project Document

Project Title : Conservation and Sustainable-use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity
 Project Number : IND/99/G31
 Estimated Starting Date : March 2002
 Duration : 7 Years
 Project Sites : Gulf of Mannar
 ACC/UNDP Sector : 0400 Natural Resources
 ACC/UNDP : 0430 Biological Resources
 Government Sector : Environment
 Government Sub-Sector : Natural Resources/Biological Diversity
 Government Counterpart : Department of Economic Affairs, Ministry of Finance
 Executing Agency : Department of Environment and Forests, Government of Tamil Nadu
 Implementing Agency : Gulf of Mannar Biosphere Reserve Trust
 UNDP and Cost-Sharing Financing

UNDP and Cost Sharing	
UNDP/GEF	: US\$ 7,650,000
UNDP	: US\$ 1,000,000
Counterparts Contribution	: US\$ 18,085,000
(Parallel financing in Cash and Kind as follows:)	
GOI/GoTN	16,965,000
MSSRF/CMFRL	
Banks/Private	1,120,000
Total	: US\$ 26,735,000

U.S. official exchange rate when signing project document January 2002 US \$ 1 = INR 47.60

Brief Description: The overall objective of this project is to conserve the Gulf of Mannar Biosphere Reserve's globally significant assemblage of coastal Biodiversity and to demonstrate, in a large biosphere reserve with various multiple uses, how to integrate Biodiversity conservation and sustainable coastal zone management and livelihood development. The focus of the project is on empowering local communities to manage the coastal ecosystem and wild resources in partnership with Government and other stakeholders and making all accountable for the quality of the resulting stewardship. Specific Government and village-level institutional capacities will be strengthened, stakeholders will apply sustainable livelihoods, and an independent, statutory Trust will ensure effective inter-sectoral co-operation in the sustainable conservation and utilisation of the GoMBR's biodiversity resources.

On behalf of	Signature	Date	Name and Title
Government of India (DEA) Ministry of Finance		7/03/02	Sanjeeva Kumar Director (FB)
Department of Environment & Forests Government of Tamil Nadu		9/2/02	Girija Vaidyanathan Secretary
UNDP			Brenda Gael McSweeney Resident Representative



PROJECT BRIEF

1. IDENTIFIERS

PROJECT TITLE :	India: Conservation and Sustainable-use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity
DURATION :	7 years
Implementing Agency:	UNDP
EXECUTING AGENCY:	Ministry of Environment and Forests, Government of India
REQUESTING COUNTRY:	India
ELIGIBILITY:	CBD ratification 18/02/94; Notification of Participation 12/05/94
GEF FOCAL AREAS :	Biodiversity
GEF Programming Framework:	OP 2, Coastal, Marine and Freshwater Ecosystems.

2. SUMMARY:

The Gulf of Mannar Biosphere Reserve is located in Southern India's Gulf of Mannar with a core area known as the Gulf of Mannar Marine National Park that is comprised of 21 islands from between one and four kilometers offshore along 160 kilometers of coastline. The Park is surrounded by a buffer zone extending for 10 kilometers out in every direction, including the coastal area where the people live. The Reserve's diversity is principally threatened by habitat destruction, over-harvesting of marine resources, and to lesser, more localized extent, civic pollution. The overall objective of this project is to conserve the Gulf of Mannar's globally significant assemblage of coastal biodiversity and to demonstrate, in a large biosphere reserve with various multiple uses, how to integrate biodiversity conservation into coastal zone management plans. To this end, the Government of Tamil Nadu will establish the Gulf of Mannar Biosphere Reserve Trust (a Foundation) to ensure effective inter-sectoral coordination and facilitate mainstreaming of biodiversity conservation issues into the productive sector and policy development. An adaptive management approach will employ the results of targeted studies and monitoring to ensure appropriate adaptation of local level resource use. The end result will be adaptive, iterative and participatory management of the Reserve. The statutory Trust/Foundation is seen as an innovative mechanism that will allow for project methodologies and results to be replicated for the rest of the coastal area of Tamil Nadu and demonstrate an institutional model for India as a whole. By the end of this project, the significant sustainable development baseline leveraged by the PDF B phase in terms of co-financing and policy shifts will ensure that biodiversity is conserved and demonstrated. Park management will have been strengthened and the attendant biodiversity conserved. Conservation will be effected through traditional protected area work in the Park, integrated biodiversity conservation and coastal zone management in the buffer zone. Sustainable livelihoods will be established through the modification of existing non-sustainable activities in the buffer zone. The Park will be zoned for management of priority habitats, and buffer zone communities will be full participatory stakeholders in park management. Degradation of priority habitat areas will have been stopped and active management of key species and plant communities underway. Technical and administrative staff of local and national institutions will have been trained in integrated coastal area management. This project has already leveraged significant co-financing from the GoI and GoTN, as well as significant policy in the establishment of the Trust/Foundation.

3. COSTS AND FINANCING (US\$):

GEF: Project	US\$ 7.65 million
[of which administrative cost is:	US\$ 0.25 million]
PDF B	US\$ 0.20 million
Sub-total GEF:	US\$ 7.84 million
Co-financing:	
Government of Tamil Nadu cash	US\$ 11.18 million
Government of India in-kind	US\$ 5.80 million
M.S.S.R.F.	US\$ 0.05 million
UNDP	US\$ 1.00 million
Other Donors	US\$ 1.07 million
Sub-total co-financing:	US\$ 19.09 million
Total Project Cost:	US\$ 26.74 million (excl. PDF B)

4. ASSOCIATED FINANCING (MILLIONS OF US\$): **US\$ 22.45 million**

GEF Alternative Total (millions of US\$): **US\$ 49.38 million**
[PDF B cost included]

5. POLITICAL FOCAL POINT ENDORSEMENT (SEE ANNEX VII):

Name: Ms. Geeta Narayan **Organization:** Department of Economic Affairs,
Ministry of Finance
Title: Under Secretary (FB) **Date of endorsement:** 16 February 1999

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Abbreviations

BoBP	Bay of Bengal Programme
CAN	Coastal Action Network
CBD	Convention on Biological Diversity
CMFRI	Central Marine Fisheries Research Institute
CSMCRI	Central Salt and Marine Chemical Research Institute
CRZN	Coastal Regulation Zone Notification
DAHF	Department of Animal Husbandry and Fisheries
DoEF	Department of Environment and Forests
FSD	Fisheries Department
FD-WW	Forestry Department-Wildlife Wing
GEF	Global Environment Facility
GoI	Government of India
GoTN	Government of Tamil Nadu
CMA	Coastal Management Authority
ICZM	Integrated Coastal Zone Management
IIT	Indian Institute of Technology
IUCN	International Union for the Conservation of Nature
MSSRF	M.S. Swaminathan Research Foundation
MoEF	Ministry of Environment and Forests (Government of India)
NABARD	National Bank for Agriculture and Rural Development
NGOs	Non-governmental Organization
PDF-B	Project Development Facility, Block B (GEF project development grant)
RDD	Rural Development Department
SWD	Social Welfare Department
TNPCB	Tamil Nadu Pollution Control Board
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Science, and Cultural Organization
URAs	User Rights Agreements
VMCC	Village Marine Conservation Councils
WB	World Bank
WWF	World Wildlife Fund
ZSI	Zoological Survey of India

1. BACKGROUND AND PROJECT CONTEXT

1. Environmental context: India is one of the world's twelve megadiversity countries, which together account for 60-70% of the world's biological diversity. Comprised of over 130,000 species of plants and animals¹, India's biological diversity can be attributed in part to the country's ten biogeographic zones, from the Trans-Himalayan to the Coastal, and its location at the confluence of three major biogeographic realms, the Indo-Malayan, the Eurasian, and the Afro-Tropical. The Gulf of Mannar is located on the southeastern tip of India in the state of Tamil Nadu. The Gulf is known to harbor marine biodiversity of global significance, falling within the Indo-Malayan realm, the world's richest region from a marine biodiversity perspective. The Gulf's estimated 3,600 plant and animal species make it one of the richest coastal regions in India.

2. The Gulf of Mannar Biosphere Reserve (hereafter referred as the Reserve) is located in the coastal marine zone of the Gulf itself. It is the first marine Biosphere Reserve not only in India, but in all of south and south-east Asia. The Reserve has been selected as an international priority site based on criteria such as bio-physical and ecological uniqueness, economic, social, cultural, scientific importance, national and global significance². The IUCN Commission on National Parks and Protected Areas, with the assistance of UNEP, UNESCO and WWF, identified the Reserve as being an area of "particular concern" given its diversity and special, multiple-use management status. The Reserve was one of six areas chosen for inclusion into an action programme to save India's protected areas for future generations on the basis of its threatened status and richness of biological wealth³.

3. The Reserve is comprised of a 560 km² core area of coral islands and shallow marine habitat, surrounded by a 10 km wide, 160 km long buffer zone. The Gulf of Mannar Marine National Park (hereafter referred to as the Park) comprises the core area of the Reserve and is made-up of 21 uninhabited islands ranging in size from 0.25 ha to 130 ha and lying between one and four km offshore, surrounded by shallow waters. The buffer zone is comprised of Gulf waters to the south and an inhabited coastline to the north (See map in Annex VI).

4. Seventeen different mangrove species occur within the Reserve and act as important nursery habitats. One species, *Pemphis acidula*, is endemic to the Reserve; five other mangrove species occur here and nowhere else in India. The shallow waters of the Park have the highest concentration of seagrass species along India's 7,500 km of coastline. All six genera and 11 species of seagrass recorded in India occur in the Reserve. Six of the world's twelve seagrass genera and eleven of the world's fifty species occur here. One species of seagrass, *Enhalus acoroides*, a monospecific genus of seagrass is endemic to the Reserve. These same shallow waters are also known to have at least 147 species of marine algae (seaweed). These seagrass and algal beds support complex ecological communities and provide feeding grounds for many animals, including the globally endangered marine mammal dugong (*Dugong dugong*).

¹ Mittermeyer, R., and T. Werner. 1990. Wealth of plants and animals unites "megadiversity" countries. *Tropicus*. 4:4-5.

² Kelleher, G., Bleakly, C. and Wells, A. *Global Representative System of Marine Protected Areas*, Volume II, 1995

³ Rajiv Gandhi Foundation. *Protecting India's Endangered National Parks* Rajiv Gandhi Foundation, 1995).

5. Productive fringing and patchy coral reef surrounding the Park's islands are comprised of at least 91 species of coral belonging to 37 genera. The islands are used by 168 migratory bird species. The sandy shores of most of the islands provide nesting habitat for sea turtles and all five species of marine turtles have been recorded nesting on the islands. Of the 2,200 fish species in Indian waters, 450 species (20%) are found in the Gulf, making it the single richest coastal area in the Indian sub-continent in terms of fish diversity. Over 79 species of crustaceans, 108 species of sponges, 260 species of molluscs, and 100 species of echinoderms occur in the Gulf.

6. The Park's Krusadai Island exemplifies the biological significance of the Gulf. The island's surrounding shallow waters harbours three species of seagrass that are found nowhere else in India. Representatives of every animal phylum known (except amphibians) are found on this island. The island is also home to an endemic organism called *balanoglossus (Ptychodera fluva)*, a taxonomically unique living fossil that links vertebrates and invertebrates. The island is referred to in the region as a biologist's paradise.

7. **Socio-economic context:** India has a total population of over 900 million people, with a growth rate of 2.1% per annum. Over 70 million people live in the State of Tamil Nadu. Approximately 100,000 people live in the 44 villages along the Reserves' coastal area. A participatory rural appraisal and socio-economic benchmark survey of 1,000 households were conducted under Block B project preparation activities. Both covered the coastal areas of the two Districts within the Reserve's coastal buffer zone: Tuticorin and Ramanadapuram. They revealed that the livelihood of people in villages up to 10 km away from the coastline is at least partly dependent upon coastal and marine resources. Villages over 10 km from the coast have little interaction with the coast and are largely dependent upon agriculture and allied activities.

8. Over 35,000 of the 100,000 people living in the Reserve's buffer zone make their living from fishing, seaweed collecting, or other marine-based activity. Of the 35,000, approximately 20,000 live in villages directly abutting the coast make their living from the sea. Ninety percent of these fisherfolk are artisanal (using wind or small engine powered craft) and 10% are mechanized trawler fishermen. The Reserve's fishery is dominated by lesser sardine, silver belly, sciaenid, mackerel, anchovy, thread fin, brean, holothurian, lobster, mollusks and prawns. Mechanized boats exploit these resources by multi-gear systems such as fish trawls, pair trawls (illegal), drift nets, gill nets and bottom set gill nets. Smaller, traditional motorized and non-motorized boats use bag nets, purse seines, gill nets, trammel nets, and hook and line set-ups.

9. The on-going mechanization of the fishery has displaced women from their traditional role in processing and marketing, forcing them to take up alternative livelihoods. Existing livelihood-related programmes in the buffer zone area do not provide adequate economic alternatives, and in particular do not adequately meet the needs of women fisherfolk. As a result, peoples' only alternative livelihood option has been the harvesting of wild seaweed or coral, which they have been over-harvesting. Existing livelihood programmes are also plagued by information gaps preventing the neediest people from accessing information on appropriate technologies, markets and reasonable lines of credit. Currently, moneylenders provide most of the available credit at prohibitively high rates of interest.

10. The population of the city of Tuticorin is approximately 320,000. Located just outside the southern tip of the Reserve's buffer zone, it is a regional electrical power center with some manufacturing, an ISO 9002 port facility, a large salt making industry, and serves as a local fishing center. Tuticorin's fishing fleet is the most mechanized/modernized in this part of India. Consequently, these boats are able to and do exploit the fishery far offshore and, for the most part, outside of the Reserve boundaries.

2. BASELINE COURSE OF ACTION

11. Policies, Legislation and Institutions The GoI and the State of Tamil Nadu designated the coastal marine area of the Gulf of Mannar as a National Biosphere Reserve in 1989 in order to conserve the Gulf's 21 coastal islands and their surrounding shallow water mangrove, coral and seagrass habitats. In India, biosphere reserve and national park management responsibilities are primarily vested with the state government. The Ninth Five-Year Plan of the Government of Tamil Nadu, 1997-2002, describes baseline activities planned for implementation in the project area. Despite the government's recognition of the significance of the Reserve as well as its willingness to develop cross-sectoral mechanisms to successfully manage the Reserve, higher funding priorities have meant that the GoMBR has struggled to maintain minimum levels of operation. There is no indication in the existing baseline scenario that this situation will change.

12. The institutions and respective laws and policies affecting Tamil Nadu's coastal zone are somewhat disparate and uncoordinated. Several institutions have legal and policy mandates related to proposed project activities within the Gulf of Mannar. The Tamil Nadu Forest Department, Wildlife Wing (FD-WW) of the Department of Environment and Forests has primary responsibility for the Park's 21 islands and their surrounding marine environments. The FD-WW receives its Park management authority from two Acts. The *Tamil Nadu Forest Act* (1887) gives it the responsibility for the sustainable management of forest (mangrove) resources and is the legal instrument under which the GoTN develops and enforces forest management regulation. This is applicable not only to the mangrove forests in the Park, but also to fuel wood plots along the coastal area of the Park's buffer zone. The *Wildlife Protection Act* (1972) vests the FD-WW with the authority to enforce wildlife protection measures and establishes a Wildlife Advisory Board to formulate policies for the conservation of terrestrial and marine wildlife and to identify and select priority areas to be protected.

13. The *Tamil Nadu Marine Fishing Regulation Act* (1983) regulates fishing in the coastal waters of Tamil Nadu, including the Reserve waters surrounding the islands. The Tamil Nadu Fisheries Department (FSD) of the Department of Animal Husbandry and Fisheries is responsible for enforcing the prescribed regulations under this Act in order to ensure sustainable fishery management. The Act empowers the FSD to regulate the catching of fish in any specified area, the types of fishing gear to be used, and the class of fishing vessels allowed in certain areas.

14. Two laws are in force to prevent and control land-based pollution along the Gulf's coast: the *Water Prevention and Control of Pollution Act* (1974) and the *Air Prevention and Control of Pollution Act* (1974). These laws prescribe the standards for effluent discharge and air emissions and established the Tamil Nadu Pollution Control Board (TNPCB) to enforce these prescriptions.

The TNPCB also administers the GoI's *Coastal Regulation Zone Notification* (CRZN, 1986) issued by the Ministry of Environment and Forests. The Notification regulates land-use on the coastline, sets specific pollution control measures, and requires new development to be set back at least 200 meters from the high-tide mark.

15. Tamil Nadu is the first state in India to initiate the development of an Integrated Coastal Zone Management Plan, establishing a state-wide Integrated Coastal Management Authority (CMA) in August of 1998. Each of Tamil Nadu's coastal district collectors have in turn established a district-level, multi-sectoral CMA. These district-level CMAs are comprised of officials from other institutions and are responsible for ensuring compliance with the CRZN. The TNPCB offices are responsible for supporting the work of the district-level CMAs and for convening regular CMA meetings in the two coastal district offices whose territory is part of the buffer zone. The CMAs will play an important role in this project.

Threats to biodiversity:

16. Annex IV provides details on the threats and the root causes of the Reserve's loss of biodiversity. The primary threats to the globally significant biodiversity of the Reserve are, in order of importance:

- a. habitat destruction;
- b. over-harvesting of marine resources; and
- c. potential, localized land-based marine pollution from a low number of civic point-sources.

17. Habitat destruction (coral reefs, seagrass beds, mangroves) is the most serious threat to the long-term viability of the Park's globally significant resources. Coral mining, though it is illegal, has stripped most of one island's coral and threatens to do the same in other parts of the Park. Seagrass beds are harmed by inappropriate bottom trawling practices. The root causes of habitat destruction are:

- a. Lack of integrated management of the Reserve (Park and its buffer zone).
- b. Insufficient enforcement of protected area laws.
- c. Inadequate level of proactive management/Insufficient management information.
- d. Lack of local community support for the Park.
- e. Insufficient public awareness.
- f. Lack of clarity in the demarcation of protected area boundaries.
- g. Lack of alternative livelihood options.

18. The waters in the buffer zone around the Park currently suffer from the growing cumulative impacts of over-harvesting of marine resources which threaten to disrupt the ecological balance supporting globally significant biological resources in the Park and the Reserve as a whole. In a situation where there is no control exerted over who takes how much, the result has been the larger mechanized boats are catching most of the fish, precluding the smaller, traditional craft from catching their share. This in turn forces traditional craft to take up destructive practices, such as mangrove cutting and coral mining in and around the Park. The root causes of the threat of over-harvesting are:

- a. Lack of effective, marine resource property regimes.
- b. Lack of community management capacity.

- c. Insufficient enforcement of existing marine resource use rules and regulations.
- d. Lack of alternative livelihood options.
- e. Lack of adequate and fair credit arrangements.
- f. Lack of management information to drive good management decisions.

19. Localized pollution outside of the southern tip of the buffer zone represents a potential threat to the Reserve's biological diversity. Development underway in the southern part of the Tuticorin district is of concern to the long-term management of the reserve, however no discernible impact upon the Park's biodiversity has been detected from any resulting pollution.

The potential threat of pollution to the Reserve has been caused by:

- a. Lack of management information to support a more proactive enforcement programme.
- b. Inadequate enforcement of existing laws and policies.
- c. Lack of awareness of the importance of the Reserve.

Current and Planned Activities:

20. *Protected Area Management.* Park management presently operates at a minimal level, with resources and capacities inadequate to the task of conserving the globally significant biodiversity within its boundaries. A budget of under US\$100,000 per year keeps the management of the Park to its bare minimum, paying the salaries of a skeletal staff. At the same time, Government appropriations vary each year, making it difficult to plan long-term management efforts. The FD-WW has 20 part-time enforcement officers and two boats stationed along the 160 km coast. Management of the Park can be characterized as a top-down "fences and fines" approach. Park resources are insufficient to train staff in marine park management and the resulting lack of adequately trained staff and support facilities means that constructive interaction with the communities would not be possible.

21. The lack of a cooperative relationship between Park management and buffer zone communities hampers enforcement of the ban on coral mining and other activities. No concerted effort exists for the Park management to collaborate with local communities to remove the primary root causes of threats to the Reserve's biological diversity. Enforcement of existing laws within the Park is limited to *ad hoc* patrols and interventions. The current management plan calls for more enforcement, the restoration of key habitats, public awareness, a long-term management plan, and staff training. However, despite best intentions, funding constraints and the lack of community involvement results in only the minimal work being done.

22. Plans have been made for mangrove surveys and coral restoration, but their implementation is hampered by a lack of technical capacity and funding, resulting in minimal proactive field management of the priority habitats and species (mangroves, seagrass beds and coral) in the Park. The FD-WW does not have the expertise to adequately develop and carry out management and restoration programmes for these communities. Information that could be used to guide these management programmes is practically non-existent, and the degradation of the Park's seagrass beds, mangroves, and coral reef communities is expected to proceed apace. It is also expected that populations of key species would continue to decline, and possibly even disappear.

23. *Public Awareness.* The Park has produced pamphlets, posters, and brochures describing the significant species and biological values of the Park. Despite this, awareness among local people of the significance of the biodiversity within the Reserve is very low. Only 10% of those surveyed during the Block B had ever heard of the Reserve or the National Park. There is no educational programme to impart conservation values to local children and wider awareness raising efforts using the media at the local, state or national level.

24. *Buffer zone biodiversity conservation.* There is no overall management of the Reserve, nor is there any mechanism for doing so. While the FSD is the agency primarily responsible for managing the buffer zone, it serves mainly as a welfare agency for the fishing communities. There is minimal enforcement of regulations designed to protect the overall health of the Reserve's ecosystem and important biological communities. Biodiversity conservation, natural resource management and community development efforts in the buffer zone are not integrated at the ground level.

25. A small number of different groups presently conduct basic ecological and environmental research in the buffer zone and Park, which lacks focus and is not used to support the conservation of the Reserve's biodiversity. The Fisheries College and Research Institute has conducted ecological research on fisheries resources. The Central Marine Fisheries Research Institute (CMFRI) in Mandapam regularly gathers fish catch data for selected commercial species, but there is no mechanism by which to share this information with either the FSD or the Park management, and no programme to ensure that monitoring efforts focus on priority information needs. Research activities in the Reserve are uncoordinated so as to contribute to the conservation of biodiversity within the Reserve.

26. *Marine Resource Management.* The FSD is responsible for regulating the use of marine resources within the buffer zone to ensure a sustainable catch. The FSD has a small programme to reduce the loss of fish brought to market by improving docking facilities and access to markets. No cooperative management of the fishery resource base with the fishers is undertaken. As a result, the buffer zone's marine resources are an open access resource under increasing pressure. Although each fisher is required to join a fishing society in his/her village, no property regime is in place to control access to this resource. These societies serve primarily to receive welfare from the FSD. This assistance is not linked to the development of any overall management regime and no local societies have filled this void with a *de facto*, fisher-enforced property regime.

27. Existing laws designed to sustainably utilize the Reserve's marine resources by banning the use of trawlers in shallow waters as well as the use of small-mesh size nets and seasonal restrictions on various species are inadequately enforced due to lack of resources. The lack of any kind of effective property regime for coastal marine resources has resulted in a reduced catch/effort ratio. More effort is increasingly required to obtain the same amount of catch. As a result, incomes have dropped in real terms, which in turn has forced people into other, non-sustainable practices such as coral mining and wild seaweed collecting.

28. *Provision of alternative livelihoods.* Existing research programmes in the area are leading to the development of appropriate technologies for alternative livelihoods in seaweed farming

and pearl oyster farming. For example, the Central Salt and Marine Chemical Research Institute (CSMCRI) in Mandapam specializes in researching appropriate seaweed cultivation methodologies. However, research institutions lack the mandate and the expertise to transfer this technology to local people. No sustainable alternative livelihood options yet exist for the local marine resource user.

29. *Pollution monitoring and control.* Until recently, pollution control measures in Tamil Nadu have largely been voluntary, with industry reporting their emission levels to the TNPCB. During the Block B project development period, however, the state government took a more proactive approach to pollution control in the coastal zone by establishing two district-level CMAs to enforce state coastal zone regulations. These limit development in and their associated impacts on the coastal zone, supported by the state-wide CMA. The government has taken tough, proactive measures to control pollution in recent years, having banned destructive mariculture development in the coastal zone. The potential sedimentation and pollution threats from the proposed Sethusamudram canal project are recognized as being very serious and are being fully addressed as part of an ongoing public discussion of the feasibility of the project. Most of these efforts, including the CRZN law, are focussed on pollution control and do not take into account biodiversity conservation concerns. The CMAs do not yet have the capacity to address biodiversity conservation issues.

3. RATIONALE AND OBJECTIVES (GEF ALTERNATIVE STRATEGY)

30. The Gulf of Mannar's coastal and marine biodiversity of is globally significant. Both the Governments of India and Tamil Nadu have taken steps to conserve this resource. South Asia's first marine national park was established, and special management undertaken. More recently, GoTN has begun the process of establishing a state-wide ICZM programme to better manage sustainable development activities in the coastal areas. However, these steps are clearly not enough to conserve the globally significant biodiversity of the GoMBR. The GEF is being approached to ensure the long-term conservation and sustainable use of this unique assemblage of biodiversity by strengthening the management operations of the Reserve's Park and "topping-up" a co-financed sustainable development baseline in the multiple-use areas outside the Park. During the Block B phase of this project, significant funds were leveraged to finance the additional sustainable development baseline necessary in making this project coherent and effective. This project has also leverage significant policy shifts from the GoI and GoTN for the establishment of the Gulf of Mannar Biosphere reserve Trust/Foundation. Please see Component A and Section 5 for further details. Please also see Annex V which provides details on the Project Implementation Arrangements and Institutional linkages.

31. The GEF supported alternative is designed to demonstrate how to integrate biodiversity conservation into coastal zone management plans and implement the same in a large biosphere reserve with various multiple uses. To this end, the GoTN will establish the GoMBR Trust/Foundation to ensure effective inter-sectoral coordination and facilitate mainstreaming of biodiversity conservation issues into the productive sector and policy development. The Trust/Foundation will enable the project to build upon the existing and planned sustainable development activities and incorporate biodiversity conservation considerations into them. The

Trust/Foundation will allow for project methodologies and results to be replicated for the rest of the coastal area of Tamil Nadu and serve as an institutional model for India as a whole. The Trust/Foundation will have statutory authority and play a focal role in the implementation of this project, providing the institutional framework and working with Government to strengthen the overall policy framework to enable government agencies to better coordinate and collaborate in the enforcement of coastal zone regulations, including biodiversity conservation. Careful attention will be given to defining the respective multi-sectoral responsibilities of, and relationships among, the key institutional stakeholders.

32. The FD-WW, in cooperation with local communities, will implement a sustainable conservation programme for the Park. The FSD will implement a sustainable fisheries harvest programme in the buffer zone. A framework plan for the incorporation of biodiversity conservation into development plans for the buffer zone of the Reserve will be prepared, consisting of biodiversity overlays. The local communities associated with the Reserve's buffer zone will adopt sustainable alternative sources of livelihoods, reducing and alleviating pressures on the Park. District and state governments will strengthen their programme to sustainably manage the coastal zone of the Gulf, including the establishment of a pollution control office in Tuticorin City and a sustainable development baseline monitoring programme for pollution prevention in the Gulf. Topping-up this baseline, project resources will enable the two District governments, through the CMAs, to develop and apply biodiversity criteria in their coastal zone management work. In order to ensure the long-term sustainability of project results, the project will support the Government in establishing a long-term funding mechanism for the GoMBR to receive funds to implement a framework management plan for the Reserve. This mechanism will facilitate and ensure cooperation and collaboration between and among various government agencies for Reserve management. The Trust/Foundation will ensure that the project is implemented in a strategic and fully coordinated manner so that the Biosphere Reserve is managed as a single unit. A key function of the Trust/Foundation is to ensure that duplication and overlap is avoided in the implementation of the project.

4. PROJECT COMPONENTS AND EXPECTED RESULTS

Component A: **GoMBR Trust/Foundation and Long-term Funding Mechanism** (GEF: US\$1,450,000. Non-GEF: US\$4,120,000)

33. The Government of Tamil Nadu will establish a new statutory body for the Gulf of Mannar Biosphere Reserve called the "Gulf of Mannar Biosphere Reserve Trust/Foundation", seen as an innovative mechanism for developing and applying solutions to the multi-sectoral problems facing the Gulf. The Trust/Foundation will employ an **adaptive management approach** to ensure integrated biodiversity conservation and coastal zone development in the Reserve, and will have the authority to ensure that all developmental actions proposed by any sector in the Reserve are consistent with integrated coastal biodiversity conservation and sustainable management principles. To this end, **adequate legal provisions** are to be provided by the Government to the Trust/Foundation as the apex body for decision-making to implement the Reserve's framework management plan to be developed under component D. The Trust/Foundation will be comprised of a **Board of Trustees** and a **project coordination unit** (PCU). The Board will be comprised of high-level representatives of key stakeholder entities

and will serve as the executive policy-making entity of the Trust/Foundation (see Section 5 for more details on Trust/Foundation). This will be an independent, mixed public-private sector mechanism, with a balance of stakeholders.

34. The PCU will be funded by GEF to coordinate and carry out project activities, however, most of the project's activities will be carried out by germane line ministries and departments. The PCU will supervise and coordinate these activities in the project area, providing **technical guidance** to government agencies, the private sector, and local communities on biodiversity conservation activities in monitoring, species management and cross-authorized enforcement. Collaboration will be the norm among the Fisheries Department, the Forestry Department, Tourism, Rural Development, Agriculture, Industry, and local communities in on-the-ground management of the Reserve. Please also see Annex V which provides details on the Project Implementation Arrangements and Institutional linkages.

35. A **long-term funding mechanism (LTFM)** for the Trust/Foundation will be established to provide reliable funding for re-current costs of ongoing project-inspired activities. GEF would commit up to a maximum of US\$1 million based upon a 1:4 ratio for a US\$ 5 million capitalization of the mechanism. The establishment of the LTFM would be done in three steps, each with milestones that must be reached prior to proceeding to the next step. Step 1: The project will provide the technical expertise to conduct a feasibility study and establish the operational structure of the LTFM itself, including appointment of trustees, eligibility criteria for grantees, disbursement procedures, reporting requirements, and asset management arrangements. This support would be provided based upon the lessons learned from the GEF Evaluation of Conservation Trust Funds. The study would then be submitted to the Governments of India and Tamil Nadu and to UNDP/GEF for endorsement. Step 2: The LTFM would be legally established and capitalized. The capitalization would be tranching, with the first tranche being a disbursement of US\$ 500,000 of GEF resources only after the equivalent of US\$ 2 million in co-financing had been deposited to the mechanism. Step 3: Co-financing of the mechanism would proceed on a 1:4 basis, with US\$ 100,000 being deposited in the mechanism for every US\$ 400,000 of co-financing deposited until the mechanism is capitalized to US\$ 5,000,000. Steps 2 and 3 will be looked into as part of the feasibility study.

36. The Board of Trustees for the Trust/Foundation and the Board of Trustees for the LTFM should not be confused. The feasibility study will recommend the appropriate balance of stakeholders on the LTFM Board, and the Government already acknowledges that this Board not be government dominated as this is not appropriate for India. The critical enabling conditions for the consideration of a LTFM/trust fund is the strong commitment of the Government, at both the national and state levels, and commitment from the local stakeholders, as well as the high level of technical expertise not only in India, but specifically in the State of Tamil Nadu and its capital.

Component B: Strengthening the management of the Marine National Park
(GEF: US\$ 2,257,000. Non-GEF: US\$ 665,000)

37. This first component focuses on the threats to the core area of the Reserve, which is the Marine National Park. A Park management plan will be developed as an integral component of the framework management plan developed for the Reserve (Component D). GEF funds will

finance most of this component, with new and additional GoI and GoTN funds going towards increasing the number of park rangers and developing an **eco-tourism programme**, which includes a **business plan** to bolster conservation efforts. The project will strengthen the Park's management operations. This component will establish a **community-based management approach** to biodiversity conservation, developed and implemented with the active participation of coastal communities. Activities include developing species and natural community management programmes and the training of park staff. GEF funding will enable stakeholders to develop biodiversity-friendly guidelines for the Reserve buffer zone. These guidelines will be complemented by the baseline components of the eco-tourism programme.

38. **Existing rules and regulations and their enforcement will be strengthened** to enable rangers to more effectively enforce laws against habitat destruction in the Park. The GoI and the GoTN will assign additional staff to Park management. **Cooperative enforcement regimes** will be developed and agreed upon among the FD-WW, Coast Guard and the FSD. The project will also develop a programme of environmental education and awareness. **Public awareness** of the Reserve's conservation values will be imparted at the local, state, and, to a lesser extent, the national level in order to develop the support for long-term conservation efforts. A programme for **environmental education** will be developed and carried out, focusing on biodiversity conservation issues. This programme will include the development of teaching aids and training of school teachers. A **youth biodiversity conservation corps** will be created to involve students in Reserve activities. A **species and habitat management programme**⁴ will be undertaken and demonstrated for priority habitats of the Park as a whole for coral reefs, seagrass, mangrove forests, and dugong and sea turtles.

39. **Training** will be carried out to strengthen the overall management capacities of the Park. Training will be provided to Park staff in relevant fields, including conservation biology, species management, community-based management approaches to biodiversity conservation, biodiversity aspects of integrated coastal zone management and data gathering. Training will also be provided on how to integrate biodiversity concerns into existing management of marine resources and forestry.

40. A systematic **research, monitoring and information management programme** will be developed to support the conservation of biodiversity within the Reserve. GEF resources will finance **targeted biodiversity research** and **monitoring** to address the problem of insufficient information for proactive Park management to ensure the conservation of globally significant biodiversity. A **research committee** of representatives from key regional research institutions will be formed, management-oriented **research priorities defined**, and requests for proposals published. These latter proposals will be financed by various donors, and may include the GEF subject to GEF criteria. A systematic monitoring and information management (GIS) programme will be established in collaboration with institutions responsible for on-going monitoring initiatives. The necessary **equipment** will be provided to expand existing GIS capabilities in the region to focus on the needs for ICZM and biodiversity conservation of the Reserve as a whole.

⁴ This species and habitat management programme will be developed for the Reserve as a whole. The programme will be implemented in two components: one for the Park (described here) and one for the buffer zone (described under Component A). The two will be implemented in a strategic and complementary manner.

Component C: Expansion of the Park infrastructure.
(GEF: US\$ 975,000. Non-GEF: US\$ 0)

41. The second component will focus specifically on the improvement of the Park infrastructure and will be financed by GEF. Modest **new field structures** (including **interpretative facilities**) and **equipment** necessary will be provided to carry out the required tasks of park management, research and monitoring. **Park boundaries will be demarcated** through consultation with local community leaders. Local communities will be involved in the actual demarcation process.

Components A, D & E: the project in the productive land and seascape

42. Outside the Park, in the surrounding productive land and seascape of the reserve area, the project will leverage co-financing to bolster the sustainable development baseline. GEF resources will be utilized to fund incremental activities that top-up this sustainable development baseline and contribute directly to the conservation of globally significant biodiversity.

Component D: Preparation of a biodiversity overlay for the Reserve.
(GEF: US\$ 2,400,000. Non-GEF: US\$ 2,350,000)

43. While the first two components focus largely on the Park, this component focuses on the Reserve as a whole. Co-financing will finance overall sustainable development activities necessary for integrated coastal zone management of the Reserve as a whole. A **framework management plan for the Reserve** will be developed and implemented. This framework management plan will have a focus on biodiversity conservation for the Reserve and be strategically developed and implemented in parallel with the state-wide integrated coastal zone management plan (financed by the GoTN). An important component of the framework management plan will be the clear definition of Reserve boundaries, particularly on the terrestrial area. People will know whether they live within the buffer zone or in a transition area and the types of activities they can pursue on the land part and marine part will be clearly communicated. Residents and stakeholders will be fully involved in the development of the framework management plan for the Reserve, and share responsibility for its implementation. In order to address the potential of people from outside the Reserve migrating into the Reserve boundaries, the framework management plan, supported by the Trust/Foundation, will recommend policies for ensuring sustainable development policies within the Reserve consistent with the inevitable growth in population. The **capacity of the CMAs will be strengthened** for developing and enforcing the implementation of an integrated coastal zone management plan with a focus on biodiversity conservation. The Government of Tamil Nadu will strengthen its coastal zone management and pollution control/monitoring efforts in the buffer zone. The capacity of the two district-level CMAs will be strengthened so as to ensure that biodiversity conservation activities are integrated into coastal zone development activities.

44. An **adaptive management approach** will be used to effectively use the results of targeted studies and monitoring to ensure biodiversity-friendly adaptation of local level resource use. The end result will be adaptive, iterative and participatory implementation of the framework management plan for the Reserve. GoI and GoTN resources will finance **environmental research** and **monitoring** to address the problem of insufficient information for sustainable Reserve management. GEF resources will top-up these sustainable coastal management efforts

with a **framework programme for biodiversity conservation and monitoring** for the Reserve as a whole. It will determine important biodiversity conservation and environment protection criteria for incorporation into the integrated coastal zone management plan and other development plans and activities associated with the Reserve. **Priority habitats** for conservation within the buffer zone will be defined and **management programmes**⁵ will be developed with the active participation of local communities. Implementation of a biodiversity hotspot management plan will be demonstrated through a pilot project. GEF funds would be used to **strengthen the DoEF, DAHF, and the CMAs and their links to the Trust/Foundation** as the responsible authority for the implementation of the Reserve's framework management plan.

Component E: Developing and demonstrating sustainable alternative livelihood options
(GEF: US\$ 1,450,000. Non-GEF: 11,950,000)

45. The purpose of this component is to enable stakeholders to adopt sustainable livelihood options in the Reserve area immediately surrounding the Park. Financing of this component will be largely borne by the GoI and UNDP in bolstering the sustainable development baseline, with GEF resources targeted to activities designed to modify existing uses of biodiversity. Over-harvesting of near-shore marine resources and habitat destruction are major threats to the biodiversity of the Reserve. One of the primary root causes is the lack of an effective property regime for near-shore marine resources. To address this, the project will enable coastal stakeholders to develop an effective property management regime for coastal marine resources. Near-shore **marine resource management will be improved** through the strengthening of local community cooperatives and the establishment of proactive enforcement regimes.

46. First, **existing government enforcement programmes will be improved** by cross-authorization agreements between and among relevant government agencies. To this end, the project will strengthen the district level CMAs to ensure coordination and collaboration among government agencies and other stakeholders. For example, currently FD-WW officials cannot pursue coral poachers outside of the Park boundaries because their jurisdiction stops at the park boundary and the FSD's begins. The same is true for FSD officials in FD-WW waters. The strengthened linkages through the Trust/Foundation under the project will result in the development of cooperative, cross-authorization between these two agencies. This will include the **strengthening of existing laws and policies** necessary for biodiversity conservation for the Reserve. Secondly, near-shore marine resource management will be improved by enabling local stakeholders to **establish user rights agreements** (URAs). This will be done through consultations among local fisher cooperatives, trawler groups, the FSD, FD-WW and district-level CMAs. These URAs will complement existing government enforcement programmes, laws and policies.

47. GEF funds are requested to top-up the existing marine resource management baseline and the bolstered sustainable development baseline described in the previous paragraph by assisting communities in developing their own **village marine conservation plans** for key habitats and

⁵ There are key plant communities (sea grass beds and mangroves) located outside the Park, but within the reserve boundaries, that are important to supporting globally significant species (turtles, dugongs) and overall levels of biodiversity within the reserve and within the Park itself. This species management programme will be developed and implemented to be complementary to the management plans for the Park, and will focus on globally significant biodiversity in hotspots of the Reserve's buffer zone.

species in their respective area of the Reserve's buffer zone. This will be integrated with the species management programmes described under component A.

48. Another primary root cause of the unsustainable, over-harvesting of marine resources and habitat destruction is the lack of sustainable alternative livelihood options for marine resource-use users in the Reserve area. PDF Block B consultations with stakeholders revealed a ready willingness to abandon destructive activities if only appropriate alternatives were available. To accomplish this, this component will enable local stakeholders and institutions, especially women, to **undertake sustainable alternative livelihood options** through a number of training and demonstration programmes.

49. Co-financing will support the strengthening of the applied research baseline in this component (see paragraph 29). Co-financing will support the development of a **micro-credit programme** to provide marine resource users with access to capital in helping them to adopt sustainable alternative livelihoods. Additional co-funding will improve the refrigeration and access to markets in four key sites along the coast to support the viability of these new livelihoods. GEF will also provide incremental funding for an **"eco-technology"** demonstration programme comprised of two demonstration components. One of the **demonstration components** will train the artisan and mechanized fisher communities on the **sustainable use of marine resources**, which includes substitutional, less harmful, more biodiversity friendly trawling practices. The second component will target wild seaweed harvesters and coral reef miners, demonstrating and providing training in **mariculture** (seaweed farming, pearl culture, eel and mussel culture) and the **cooperative marketing of marine products**. The GEF increment of this component lies in demonstrating biodiversity friendly mariculture practices. Long-term support for extending the lessons learned from these activities will be secured from Government sources.

50. **End of project situation**: The conservation of the Gulf of Mannar's globally significant biodiversity will be ensured through the incorporation of biodiversity conservation principles and practices into existing and planned sustainable development interventions with the Reserve. The strengthened Trust/Foundation will have developed and begun implementation of an integrated biodiversity conservation and coastal zone management for the Reserve. The Trust/Foundation will have leveraged additional co-funding to ensure the sustainability of the project. This will be a demonstrable and replicable model for biodiversity conservation and coastal zone management for the State of Tamil Nadu and India as a whole. The operational capacity of the Park will be strengthened and the Park will be zoned for priority habitat management. Buffer zone communities will be participatory stakeholders in park management. Degradation of priority habitat areas (seagrass, mangroves and coral reefs) will be stopped and active management of key wildlife species and plant communities underway. Dugong habitat will be conserved, with the expectation that dugongs will be seen regularly feeding in seagrass beds. Nesting beaches will be protected allowing for the safe nesting of sea turtles. Coral reef, seagrass and mangrove management will be undertaken and demonstrated as a result of improved training in environmental management and restoration.

51. In the buffer zone, pressure on biodiversity resources will be reduced. Biodiversity conservation will be a priority objective of fisheries management and community development

efforts in general. Threats to Park biodiversity will be addressed by a consolidated biodiversity management regime in the buffer zone and an empowered partnership between strengthened local community organizations and government agencies. Biodiversity conservation decisions within the Reserve will be based upon sound information provided by a targeted research and monitoring programme. Staff from key institutions will have been trained in integrated coastal zone management and an effective pollution monitoring and control programme will ensure the Reserve's marine ecosystem maintains its capacity to support globally significant biodiversity. Stakeholders, enabled by project-supported demonstrations, will substitute destructive non-sustainable livelihoods with sustainable biodiversity-friendly alternative activities. Marine resource use will be controlled by a combination of informal property regimes enforced by fisher cooperatives and a more proactive, official enforcement regime with biodiversity maintenance as a priority. This new sustainable development approach will be supported by substituted baseline funding from the Government of Tamil Nadu and the Government of India.

52. **Project Beneficiaries:**

- a. Local village institutions (panchayat members, cooperatives, schools)
- b. Local resource users (fishers, coral miners, seaweed harvesters)
- c. Government institutions (Policy-making officials in ministries and local government, managers of biological resources from germane government departments)
- d. Scientists, representatives of business and industrial users of biological resources, and national NGOs with a stake in biodiversity issues

53. **Stakeholder Participation in Project Design:** The development of this project under the PDF Block B benefited from active stakeholder participation. A steering committee comprised of representatives from 21 key stakeholder groups (national government, regional government, regional NGOs, local NGOs, and local communities) oversaw the entire process. Detailed information on current and existing activities relative to the project was gathered by government and NGO stakeholder institutions under the Block B process. Twenty-one NGOs from the Reserve area participated in a consultation workshop to initiate project development. Three local NGOs were subsequently contracted to gather germane baseline and alternative-related information: the Society for Social Forestry and Development, the Roche Society, and the Suchetakripalini Rural Development Center. Socio-economic surveys of 1,000 households were conducted including a participatory rural appraisal in 38 villages throughout the Reserve. Two community consultation workshops were held in the Reserve, with 32 local institutions participating. A stakeholder meeting was held for government and non-government institutions to finalize roles and responsibilities for project implementation. A two-day technical workshop was also held with biodiversity experts to clarify priority concerns and actions for conservation. The final design, in particular the strengthened role of the Trust/Foundation for implementing the integrated biodiversity conservation and coastal zone management plan were unanimously agreed to at the conclusion of the PDF B process in February 1999.

54. **Eligibility under the CBD:** This project is designed to support the primary objectives of the CBD: the conservation of biological diversity, the sustainable-use of its components, and the equitable sharing of the benefits arising out of the utilization of these components. By integrating conservation and sustainable use of biodiversity into relevant plans and policies, the project will fulfil the requirements of Article 6: General Measures for Conservation and

Sustainable Use. Article 7: Identification and Monitoring and Article 8: In-situ Conservation will be supported through the strengthening of Park management and the targeted species and habitat management, research and monitoring programme. Article 10: Sustainable Use of Components of Biological Diversity will be furthered through the development and demonstration of alternative, sustainable livelihood options that avoid or minimize adverse impacts on biological diversity, providing incentives for sustainable use (Article 11: Incentive Measures). The project also supports Article 12: Research and Training by promoting targeted research on priority biodiversity in the Gulf, providing training in technical and managerial areas, and developing linkages for exchange of information (Article 17: Exchange of Information). Education and awareness raising is also a project priority (Article 13).

55. **Eligibility for GEF Financing:** The project is eligible for GEF assistance under Operational Programme #2 Coastal, Marine, and Freshwater Ecosystems, and will generate substantial global benefits. India, a recipient of UNDP technical assistance and a participant in the restructured GEF as of May 12, 1994, is eligible according to the article 9(b) of the GEF instrument.

56. The global significance of the Gulf of Mannar's biodiversity is described under the authoritative reference work entitled "A Global Representative System of Marine Protected Areas"⁶. The IUCN Commission on National Parks and Protected Areas, UNEP, UNESCO, and WWF identified the Reserve as being an area of particular concern given its diversity and special, multiple-use management status. This initiative is country driven, being consistent with relevant National Policies and Strategies for the conservation and sustainable use of biological diversity. The Gulf of Mannar is the first marine Biosphere Reserve in South and Southeast Asia and as such, has long been a national priority. The Reserve was one of six areas chosen on the basis of its threatened status and richness of biological wealth for inclusion into an action programme to save India's protected areas for future generations⁷. The MoEF's National Environmental Action Programme (1993) specifically calls for conservation and sustainable utilization of coastal ecosystems as a top priority area 'A'. India's National Conservation Strategy also establishes the conservation of coastal ecosystems as a priority under its "Agenda for Action." The MoEF is planning to use this project's coastal planning work as a model for integrating biodiversity into the planned ICZMs for India's other eight coastal states.

PROJECT IMPLEMENTATION AND STAKEHOLDER PARTICIPATION

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57. **Implementation and Execution Arrangements:** The Project will be executed by the Tamil Nadu Department of Environment and Forests (DoEF) in close collaboration with the national Ministry of Environment and Forests and the national Dept. of Ocean Development. The State Government of Tamil Nadu and the Government of India are committed to applying a new and innovative approach in India to the development of a long-term, multi-sectoral biodiversity conservation program in the Gulf of Mannar. To do this, the DoEF (with GoI support) will establish the "Gulf of Mannar Biosphere Reserve Trust/Foundation" under the Tamil Nadu Societies Registration Act as an independent governmental statutory body. The Trust/Foundation will be designed as a flexible, transparent and innovative structure and will ensure appropriate integrated coastal development actions in the project area.

⁶ Kelleher, G. et al, *ibid*

⁷ Rajiv Gandhi Foundation, *ibid*.

58. The Trust/Foundation will have a Board of Trustees comprised of 15 leading representatives of key stakeholder groups, including the State Government, MOEF, DEA, MSSRF, and UNDP. The Trust/Foundation will play more than an advisory role. The Board of Trustees will be independent, mixed public-private sector representatives, with a balance of stakeholders. First, the Trust/Foundation will play a crucial role in integrating the various sectoral activities in the project Reserve area. There is currently no mechanism by which to do this and the Trust/Foundation will be breaking new ground in this respect. Second, the Trust/Foundation will be fully “owned” by the Government of Tamil Nadu as well as the other crucial stakeholders. This will ensure that the Government acknowledges full responsibility to undertake actions recommended by the Trust/Foundation. The Chairman of the Board will be the Chief Secretary for the DoEF and other Board members will be chosen based upon their official standing and ability to effect change. Third, the establishment of the Trust/Foundation under the Societies Registration Act will give the Trust/Foundation the independent statutory status making it eligible to receive and manage funding from non-traditional sources to support conservation in the Reserve on a sustainable basis. This will provide the Trust/Foundation with an important level of status and independence.

59. Fourth, the GoTN is committed to making this Trust/Foundation arrangement effective and will ensure that adequate provisions are made during the legal registration of the Trust/Foundation so that it is given a substantive development review role in the Reserve coastal zone. In this respect, the Trust/Foundation will be empowered to oversee the implementation of agreed upon actions for integrated biodiversity and coastal zone management in the project area by all relevant government agencies and institutions, among other stakeholder organizations. Fifth, the Trust/Foundation would be evaluated by an independent entity during the third year of the project. Based on this mid-term evaluation, the GoTN will make further provisions under existing laws and statutes to enable the Trust/Foundation to play an effective role as the apex management body for the Reserve.

60. A project coordination unit (PCU) will be formed under the Trust/Foundation to implement the project. The Board of Trustees will provide guidance to the PCU through their own home institutions facilitating the coordination of the project’s work among government agencies, NGOs, communities, and other partners. Execution responsibilities for various government and non-government entities will be determined on the basis of comparative advantage (field experience, past performance, technical capacity, and cost effectiveness). The PCU will be comprised of a Director, and a staff of technical experts. Staff on loan to the project from GoTN’s FSD and FD-WW will fill at least half of these expert positions beginning in year four. The other half of these positions will be filled by staff from other government agencies, NGOs and individual biodiversity experts. The PCU will work directly partner stakeholder institutions to produce desired outputs and achieve objectives. The Director of the PCU will be responsible for the level of excellence and successful implementation of project activities. The PCU’s office will be located in an area with ready access to all parts of the Reserve. On a pragmatic level, the Trust/Foundation’s independent status will also provide for the smooth implementation of the project, which would otherwise be a cumbersome process.

61. The project's community level work will be enabled by two district-level coordination committees comprised of representatives of the key stakeholder groups at the local level. These committees will meet quarterly and will play a hands-on role in helping to develop and facilitate project implementation. Village Marine Conservation Councils (VMCCs) will be established in at least 20 coastal villages in the buffer zone of the Reserve. These VMCCs will be comprised of coastal resource user groups drawn from existing panchayats (village councils). Women will comprise at least 50% of VMCC membership. These VMCCs will be key units through which project community-based protected area management consultations and sustainable livelihood development activities will be conducted. A number of project outputs will be produced through sub-contract arrangements with other organizations, government and non-government. Annex V contains a more detailed treatment of institutional involvement in project implementation.

62. **Stakeholder input to project implementation:** Overall, the most important aspect of this project is the development of community management regimes to alleviate existing pressures on the biodiversity resource. Specifically, stakeholders will be actively involved in Reserve management at several levels. Local communities will be working with the FD-WW to develop a participatory management plan for the Park. The Trust/Foundation will include representatives from panchayats on the Board of Trustees will be closely tied to empowered local community village councils. Local stakeholder groups, both public and private, will develop the sustainable alternative livelihood options and participate in sustainable management of marine resources. It is expected that NGOs will implement components of the project. Representatives of private industry will be included on the Board of Trustees for the Trust/Foundation and the GoTN will work closely with private industry to strengthen the existing pollution monitoring and enforcement programme. What ties all of the above together is the CMA.

5. INCREMENTAL COSTS AND PROJECT FINANCING

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63. **Incremental Costs:** The baseline associated with this project is estimated at US\$22,455,000. The GEF Alternative is estimated at US\$ 49,384,000 (including the PDF B of US\$ 194,000) representing a total incremental cost of US\$ 26,735,000 (GEF Alternative minus baseline). Of the increment, GEF will finance US\$ 7,650,000 in support of activities that provide global environmental benefits. The balance of the increment has been leveraged to finance the sustainable development baseline, comprised of US\$1,000,000 from UNDP and US\$ \$16,965,000 from the national Government of India and the state Government of Tamil Nadu. Additional co-financing from the MSSRF, CMFRI and other donors (Banks, private sector, private donations) make up the balance of US\$ 1,120,000 for a total co-financing of US\$ 19,085,000 to the project. Costs have been estimated for seven years, the duration of the planned GEF Alternative. Please see Annex 1 for details.

64. **Cost Effectiveness:** This project is designed from top-down (Government) and bottom-up (community participation) to be cost-effective and produce project outputs for the least amount of money possible. GEF's Block B investment has leveraged substantial co-financing to meet the sustainable development baseline. The demonstration programme under this project is a means to cost-effectiveness in that it will demonstrate long-term sustainability of biodiversity conservation and marine resource management in and beyond the Reserve when replicated. Initiatives established under this project will be appropriate to the abilities of key players to

sustain them over the long-term. The project will also establish cost-effective partnerships among key stakeholders, spreading responsibilities for addressing conservation needs among a range of actors. In addition, the participatory approach is cost effective in that it will engender greater stakeholder “ownership” of conservation efforts, improving the chances of successful outcomes.

BUDGET

Project Components:	GEF	Co-financing	Total (US\$)
A. Trust Fund and PCU	1,450,000	4,120,000	5,570,000
• Project Coordination Unit	350,000	120,000	
• Feasibility study on long-term financial mechanism	50,000		
• Establishment of a long-term financial mechanism	50,000		
• Capitalization	1,000,000	4,000,000	
B. Strengthened park operations	2,275,000	665,000	2,940,000
• Strengthened management/enforcement	450,000	500,000	
• Park management plan	430,000		
• Eco-tourism programme	30,000	75,000	
• Species and habitat mgmt plans	455,000	40,000	
• Targeted research programme	185,000		
• Awareness and environmental education	500,000	50,000	
• Monitoring programme	225,000		
C. Expanded park infrastructure	975,000		975,000
• Demarcated boundaries	305,000		
• Strengthened Park infrastructure	670,000		
D. Biodiversity overlay prepared	1,500,000	2,350,000	3,850,000
• Framework management plan	100,000	200,000	
• Strengthened state and district CZMAs	300,000	350,000	
• Targeted research focussed on reserve	300,000	900,000	
• Biodiversity hotspot management plans developed and implementation demonstrated	500,000	500,000	
• Monitoring programme (biodiversity/pollution)	300,000	400,000	
E. Sustainable alternative livelihoods	1,450,000	11,950,000	13,400,000
• Commercial species inventories		400,000	
• Improved marine resource management		2,100,000	
• Improved enforcement regimes		2,000,000	
• Strengthened Coops/User rights agreements		450,000	
• Village marine conservation plans	300,000		
• Micro-credit programme		900,000	
• Improved local infrastructure		2,500,000	
• Develop coastal woodlands/agroforests		1,000,000	
• Modified Government development programmes		1,000,000	
<i>Demonstration Programme</i>			
• Comp 1: Sustainable use of marine resources	300,000		
• Comp 2: Mariculture/cooperative marketing	850,000	1,600,000	
Project Support Services	250,000		250,000
Total:	\$7,650,000	\$19,085,000	\$26,735,000

6. RISKS AND SUSTAINABILITY

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65. **Project Risks:** Overall, the project has been designed in such a way that the risks have been minimized. Risk reduction in conservation and sustainable use activities has been a key consideration in the design of the project, from the management structure to the strategic approach, to the integration of best practices. Lessons learned from other projects have been brought to bear on the design of this project. Careful attention has been paid to other similar integrated conservation and development projects in India (e.g., the GEF Eco-development project and coastal zone management projects in Argentina, Belize, Cuba and Dominican Republic). Best practice reviews have also been consulted⁸. Annex II on the log frame provides further information on project risks.

66. There is a risk that the necessary complementary activities like policy changes and programme re-alignment will not take place. This risk is reduced by the commitment of government to make the necessary complementary changes in support of the project (i.e., the establishment of the Trust/Foundation as a government statutory body responsible for coordinating development actions in the project area and the strengthening of key institutions like the CMAs). This commitment is evidenced by the government's endorsement of this project and substantial cost sharing. The Government may change at any or all levels, resulting in a change in commitment to project objectives. However, this project has been seen from its inception as being a non-partisan, win-win project. In addition, the Trust/Foundation's Board of Trustees will be chosen in large part on the member's ability to secure strong support from civil society for successful project implementation.

67. The risk that local communities will not accept and respect the boundaries of the conservation areas and the limits imposed on biological resource extraction is small. Consultations undertaken during the Block B with local communities indicate that there is widespread support for the strengthening of conservation measures if they are developed in a participatory manner and enforced on an equitable basis. This will be assured at all project levels, from local community representation on the Trust/Foundation to a participatory protected area management programme involving local community councils, and a sustainable development programme tailored to removing the root causes of biodiversity loss by assisting local communities.

68. **Sustainability:** Limitations in India would rule-out any long-term support of an expensive, top-heavy coastal biodiversity conservation programme. This project has therefore been designed in order to maximize the long-term institutional and financial sustainability of project-inspired activities. Existing institutions will be strengthened and used to implement most of the project's activities and institutional sustainability will be ensured through capacity building of key stakeholder groups (government departments, NGOs and local communities) by strengthening their capacities to undertake conservation activities. Only the role of Reserve management will be filled by a new institution to be established by the GoTN: the GoMBR Trust/Foundation.

⁸ de Fontaubert, A. Charlotte, et. al. 1996. Biodiversity in the Seas: Implementing the CBD in Marine and Coastal Habitats. IUCN. Washington, D.C. USA. and

Nakashima, S. 1997. Integrated Coastal Management as Best Practice in GEF Project Development: Lessons from Biodiversity Projects in Marine, Coastal and Freshwater Ecosystems. Unpublished. UNDP-GEF, New York, New York, USA.

69. Over the life of the project, partnerships among government authorities, NGOs, the private sector, and local communities will be established to sustain integrated conservation efforts in the long-term. The project will employ a sustainable approach for the development of sustainable livelihoods by providing training through a demonstration programme comprised of two components and empowering local resource users to effectively access micro-credit support. Sound and practical methods for resolving conflicts, improved planning and management of protected areas, and strong institutions and human resources for the planning and management of coastal zone development activities are also important. Legal mandates must be clear in order to successfully integrate the activities of diverse sectors. The Trust/Foundation will play an important facilitating role in these two areas. By the end of the project, the regular FSD, TNPCB, and CMA budgets would absorb the sustainable development baseline costs. The Trust/Foundation will, as part of the project, work with government and other donors, and in particular the private sector, to mobilize resources to finance sustainable alternative livelihood options. The recurrent cost of biodiversity conservation activities is presently estimated at US\$ 300,000 per year, representing an additional US\$ 200,000 to the existing US\$ 100,000 per year (approximately provided by the Government). These costs will be absorbed by the LTFM to be capitalized with at least US\$5 million during the life of the project. The LTFM would thereby ensure the sustainability of project outputs.

7. MONITORING, EVALUATION AND LESSONS LEARNED

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70. **Monitoring:** This project integrates a comprehensive monitoring and evaluation programme. An information baseline on ecosystem structure and function and sustainable use will be established during the first year of the project in order to provide a basis for future monitoring and evaluation. Project progress will be monitored by: 1) measuring the populations of native, priority species, including indicator species; 2) conducting ecological surveys within the protected area to determine specific health and extent of key habitats; 3) measuring the quality of the processes (e.g., water quality); and 4) surveying the impacts on the livelihoods and participation of local communities and of their level of support for conservation efforts. Please see Annex II on the log frame for additional information.

71. The Trust/Foundation/PCU will be responsible for developing analytical and sampling tools for monitoring. Institutional capacities will also be monitored, in particular as to their implementing role under the Trust/Foundation. The Trust/Foundation will have responsibility for monitoring and evaluating the scope and content of all project activities, taking into account lessons learned in the implementation of the World Bank-GEF "Ecodevelopment" project in India. In addition, the project will conform to standard UNDP procedures for monitoring and evaluation. Every six months, the PCU will present progress reports to the Trust/Foundation to inform decision-making.

72. **Evaluation:** Outcomes will be evaluated by measuring indicators of ecosystem health and function as well as sustainable use. Three external evaluations are scheduled, one in year two, one in year four and a final review just near the end of the project. These independent evaluations of project performance will match project progress against predetermined success indicators. In addition, annual participatory evaluation exercises will be undertaken with key stakeholders, including local communities, NGOs, and partner organizations. UNDP will report

on project performance to the GEF at the annual Project Implementation Review (PIR). The project will document the lessons learned, and make it available to stakeholders over the world-wide web.

73. **Lessons Learned** This project benefits from a review of GEF experience and best practices in integrated coastal zone management (Nakashima, 1997). Government multi-sectoral coordination and enforcement bodies were found to be a strategic component of coastal biodiversity projects. A lengthy and sustained process was found to be necessary to achieve biodiversity conservation using an integrated management framework. Experience in Argentina, Belize, Black Sea, Lake Tanganyika and Jordan demonstrate that development of integrated management policy and its acceptance does not occur quickly. In most cases, the projects must establish a sustainable institutional mechanism, with strong government commitment, for integrated management and conservation of biodiversity. To meet this objective, they must provide technical expertise for issue identification, biodiversity assessments, environmental surveys, public awareness building, training, legal and institutional analysis, GIS and databases, and the supervisory focus for managing all these activities. Lessons learned suggest that a two-track approach be used to build capacity at the national policy level (regulations and institutions) while at the same time integrating implementation activities at the local and community level.

74. Sound methods for resolving conflicts, improved management of protected areas, and strong institutions for the planning and management of coastal zone development activities, and clear legal mandates are important in order to successfully integrate the activities of diverse sectors. The Trust/Foundation will play an important enabling role in this regard, and based upon experienced to date, will arrange for a sustainable source of funding to continue its work. This is based on the expectation that when the project ends, the host country will embrace the new management paradigm, adopt its policies, recommendations and staff expertise and provide the necessary funding to carry on. Overall, an adaptive management approach will be employed by the Trust/Foundation to feed lessons learned back into the framework management plan for the Reserve, making it dynamic and continuously improving the integration of biodiversity conservation principles.

75. **Replicability:** The lessons learned during the implementation of the project will be documented and disseminated to professionals and decision-makers working in India and South Asia and other regions where marine biosphere reserves may be appropriate. The Government of India sees this project as an important model for other Biosphere Reserves that are both already operational (e.g., Sundarbans Biosphere Reserve and Great Nicobar) and proposed (e.g., Lakshadweep Islands and Little Rann of Kutch). The Government has developed a Biosphere Reserve programme that is based upon UNESCO's guidelines and concept of biosphere reserves. Although not participating at this time, the Government of India see this project as a means of facilitating and capacitating them towards appropriate biosphere reserve management. (Please see Annex VIII, outline of the Government of India's Biosphere Reserve Programme). The results of monitoring and evaluation exercises will be made available by UNDP to interested parties in line with GEF's policy on information sharing. The lesson learned from the implementation of the World Bank Eco-development project were brought to bear in the design of this project, notably in connection to ensure to community participation in the management of protected areas.

9. Response to the STAP Technical Review

76. The review by the STAP expert found this project to be of major importance and overall well designed. A number of comments provided were helpful and the brief has been revised to incorporate these. In particular, the brief has been strengthened to explain that the project and its components will be undertaken in a coordinated and strategic manner. The adaptive management approach to be taken by the project will further ensure this. The targeted biodiversity research and monitoring will be undertaken for the Reserve as a whole, to ensure sufficient scientific information needs are met. This will result in the additional information necessary to ensure the conservation of globally significant biodiversity, particularly species such as the dugong and turtles. The project can not establish a permanent research and observation station, but rather the project will strengthen management information systems at existing institutions.

77. The preparation of the biodiversity overlays and framework management plan will include a clear definition of the Reserve boundaries, particularly on the terrestrial side, and a clear communications strategy so that people know whether or not they live in the buffer zone or its transition areas. The types of activities that can be pursued will also be clearly communicated. Zonation will feature as an important activity, as well as the identification of sustainable alternative livelihood options. The Trust/Foundation will ensure that full guidance will be provided to ensure that eco-development does not take precedence over biodiversity conservation needs. Furthermore, the absorptive capacity of the buffer zone and the Reserve as a whole will determine the nature and extent of the sustainable alternative livelihoods. Special care will be taken so that the project does not create a “magnet” effect for dis-enfranchised people outside of the Reserve.

78. This project would be an important model for demonstrating lessons learned and best practices for the establishment and management of biosphere reserves. The project would also benefit from lessons learned in other integrated coastal zone projects, as well as the World Network of Biosphere Reserves. Following the GESAMP’s experience, the project is designed in its implementation arrangements that two tracks of policy reform and resource management be integrated. The bottom-up approach will emphasize activities at the local community level that may be transferred to catalyze action. The top-down approach will focus on the government and its institutions and procedures and the need for policy reform to enable, ensure and enforce activities to meet common objectives.

79. The sustainability of the project is further ensured by the creation of the Gulf of Mannar Biosphere Reserve Trust/Foundation, and the project will, during the first year of implementation, undertake to prepare a feasibility study on the appropriate structure and design of a long-term financing mechanism.

List of Annexes:

Annex A: Incremental Cost Analysis

Annex B: Logical Framework/Project Planning Matrix

Annex C: Scientific Technical Advisory Panel Technical Review

Optional Annexes (Available upon request):

Annex D: Threats/Root Causes/Proposed Actions Matrix

This annex provides more detail on the major threats to the biodiversity of the Reserve area, the root causes of those threats, and activities designed to remove the root causes. It is presented in the form of a matrix.

Annex E: Project Implementation Arrangements/Stakeholder Participation Summary

This annex summarizes the stakeholder institutions germane to the Gulf of Mannar, their organizational purpose, and their role in the project. This includes a description of the relationships between the Government of India, Government of Tamil Nadu, Integrated Coastal Management Authorities, Project Coordination Unit, Gulf of Mannar Biosphere Reserve Trust/Foundation, other governmental agencies and project actors.

Annex F: Map of Gulf of Mannar Biosphere Reserve Project Area

This map illustrates the location and boundary of the Gulf of Mannar Biosphere Reserve.

Annex G: GEF Focal Point Endorsement

Annex A: Incremental Cost Analysis

1. Broad Development Goals:

1.1 The Government of India has acknowledged the importance of conserving its rich biological heritage by ratifying the Convention on Biological Diversity in February 1995. India's Environmental Action Programme (1993) has as top priority area 'A' the conservation and sustainable utilization of coastal ecosystems. India's National Conservation Strategy also specifically includes the conservation of coastal ecosystems as a priority in its "Agenda for Action." The GoI designated the coastal area of the Gulf of Mannar as India's first National Biosphere Reserve in 1989, in itself an act of prioritization. The Rajiv Gandhi Foundation identified the Reserve as a top national priority for conservation. Tamil Nadu is the first state in India to begin developing an ICZM plan and has recently established CMAs at the district level to ensure that coastal zone regulations minimizing pollution and restricting development are followed. As a result, the MoEF is planning to use this project's coastal planning work as a model for integrating biodiversity in future ICZM initiatives in India's other eight coastal states.

2. Baseline (Business as Usual):

2.1 Despite the GoI's policy goals, there remains a considerable unmet need for conservation. This section describes existing and planned activities as well as existing gaps that would normally occur in the absence of the GEF Alternative project. *Protected Area Management.* Baseline financing for the next seven years (US\$600,000) for the management of the Park will be provided by the MoEF. Despite best intentions on the part of GoI and GoTN, this funding is insufficient to implement even a reasonably scaled-back version of the Park's current management plan. Government allocations are inadequate and vary from year to year in light of conservation needs. Consequently, under baseline conditions, the Park will continue to operate at a minimal operational level. In the absence of the project, the GoTN may take the final, official step in legally establishing the Park. But no participatory management of the Park would be undertaken. No systematic, focussed management of key species and habitats would occur and the destruction of key habitat and priority ecological communities would remain under stress. The present staffing of ten full-time staff would be able to implement 20% of the existing management plan over the next seven years. *Public Awareness.* Existing low-level public awareness raising activities (posters and brochures on coral reef protection) would continue to be implemented by the FD-WW. Traditional fisheries materials (regulations, poster) would continue to be produced by the FSD. Financing of US\$100,000 would be provided for these activities, in the absence of the GEF intervention.

2.2 The FSD is the primary agency responsible for managing the buffer zone. The FSD's mandate is to serve primarily as a welfare agency for the fishing communities. Consequently, emphasis is placed upon providing social services to fishing communities rather than developing and enforcing a sustainable fisheries management regime. Little proactive management is undertaken to maintain a certain baseline of biodiversity or ecological health in the near shore waters that comprise the buffer zone around the Park. Enforcement of existing wildlife laws is insufficient to achieve the desired result and no mechanism exists for developing a coordinated management approach to eliminating threats to the Reserve's biological diversity that emanate from the coastal buffer zone. The recently established CMAs in each of the two coastal districts within the Reserve's buffer zone are comprised of officials from existing institutions. The

CMAAs will be charged with enforcing state coastal zone regulations. These regulations are presently not concerned with biodiversity conservation issues.

2.3 In the absence of the project, there would be minimal systematic research, and no monitoring and evaluation programme for the Reserve area over the next seven years. Disparate groups would continue to conduct some environmental research in the area, but the work would not be used to support any specific management objectives or programmes. Baseline funding for environmental research programmes in the Reserve area totals approximately \$1,250,000 over the next seven years. While this is inadequate, the ZSI marine biology station and other such institutions in Chennai would still be able to conduct some research in the Reserve area. Baseline funding would come from GoI for regional research institutes (e.g., CMFRI, CSMCRI). This baseline level also includes the work that would be conducted by three regional universities and the TNPCB field stations. All told, research would be conducted on fish catch data for selected commercial species, nutrient recycling and mangrove ecosystem dynamics, breeding and biology of fisheries resources, and coral reef ecology.

2.4 *Coastal marine resource management.* Baseline coastal marine resource management in the Gulf will continue to be focussed on increasing catch levels with minimal enforcement of regulations designed to protect the overall health of the Biosphere Reserve ecosystem. Cooperative, community management of marine resources will continue to be a distant possibility and these will continue to be an open access resource. No property regime will be enforced to manage or control access to them. Baseline financing for FSD programmes in the Gulf of Mannar coastal area will total approximately US\$ 7,880,000. Seventy percent of that would be spent on fisherfolk welfare programmes (housing, insurance, and a link road). Fifteen percent would go to support patrolling and inspections and the remaining on various training and demonstration activities. An umbrella NGO called CAN will spend approximately \$10,000 on raising awareness of the need for better fisheries management.

2.5 *Provision of Sustainable Livelihoods.* Existing livelihood-related programmes in the buffer zone area will continue to ignore the development of sustainable alternatives. Women's needs would continue to be inadequate. In the majority of cases, people would continue to be forced to seek credit from moneylenders at prohibitively high rates of interest, resulting in more pressure on the resource to repay the interest. The information gap would most likely grow wider; fisherfolk and other stakeholders would continue to be unaware of alternative options. As a result more people will take up unsustainable livelihoods as a matter of "only resort," increasing unsustainable pressure on the biodiversity resource from over-fishing, illegal coral mining, and over-collecting of wild seaweed.

2.6 Baseline financing for livelihood development in the buffer zone would total approximately US\$ 4,500,000. These programmes would include low level CMFRI and CSMCRI programmes to promote alternative mariculture technologies. The Prime Minister's Employment Programme would continue to train some individuals in basic skills like bicycle repair. The Integrated Rural Development Programme, Training for Rural Youth, and Development of Women in Rural Areas would be the three important employment generation programmes for development of employment skills. Approximately US\$1 million would be spent on various schemes to assist widows or assist young women in getting married. Less than

fifty small, self-help micro-credit groups would continue to struggle to succeed in developing viable alternative livelihoods without any external support. The DoA supports a farmer extension and subsidy programme to encourage the growing of special crops. In a business as usual scenario, coastal stakeholders in the GoMBR would be provided approximately US\$ 6 million in credit by the private money lenders in the area, who charge highly usurious rates of interest. There currently is no ecotourism conducted at all in the buffer zone area.

3. GEF Alternative

3.1. The co-funded GEF Alternative proposed by this project is designed to address the root causes of the main threats to the Reserve coastal biodiversity. The Alternative will do this by enabling stakeholders to conserve the biodiversity in a sustainable manner. This project will modify the baseline/business as usual scenario with GEF incremental funding for activities that provide global environmental benefits and complemented by co-financing for those sustainable development activities necessary to provide global environmental benefits. A portion of the co-financing will go to project activities that provide global environmental benefits, notably for the strengthening of the Park management operations. It will also reduce threats related to habitat destruction and the over-harvesting of biological resource emanating from outside the Park by enabling stakeholders to sustainably utilize the biological resources outside the Park. The following is a brief description of the proposed GEF Alternative.

3.2. *Park Strengthening:* GEF financing will strengthen the management of the Park. The project will strengthen the Park by helping the stakeholders to establish a community-based approach to Park management, helping stakeholders to establish a proactive, participatory community management plans. Boundaries will be demarcated and with community involvement, zoning of priority habitats will be defined. Priority habitats will be restored and active ecosystem/species management underway. Infrastructure of the Park will be improved, including some modest new field structures and equipment necessary to carry out required tasks. Enforcement of existing rules and regulations will be strengthened by a new government commitment and co-financing to assign more wardens to the Park. In addition, existing law and policy gaps will be “filled” in order to enable BR managers to more effectively enforce existing rules and regulations. Modest GEF funding will support the development of eco-tourism guidelines and a framework minimizing impact on the Park’s biodiversity of the development of low-scale eco-tourism industry in key areas of the buffer zone. Co-funding will support the actual development of an eco-tourism programme for these promising areas.

3.3. GEF funds will support the development of educational and media outreach programmes. A sophisticated, yet technologically, and culturally appropriate approach will be developed targeting stakeholders in the coastal zone itself as well as decision makers in government and the private sector at local, regional and national levels. Supplemental classroom materials will be developed and local teachers trained in its presentation.

The project in the productive land and seascape: integrating biodiversity conservation into leveraged sustainable baseline activities.

3.4. Outside the Park, in the surrounding productive land and seascape of the reserve area, the project Alternative will mobilize non-GEF financial resources to modify the sustainable

development baseline in the coastal zone. GEF resources will be utilized to fund incremental activities that top-up this sustainable development baseline and contribute directly to the conservation of globally significant biodiversity.

3.5. The GEF Alternative is designed to enable conservation and sustainable management of biodiversity in the buffer zone. The GoTN will establish an innovative government statutory body for the integration of biodiversity conservation into coastal zone management policies for the Gulf of Mannar Biosphere Reserve. The body is known as the Gulf of Mannar Biosphere Reserve Trust/Foundation. The new structure will be of a “low-transaction cost design” that relies upon existing institutions to carry out most activities. The Trust/Foundation will serve as the key integrating mechanism for developing solutions to the multi-sectoral problems facing the Gulf. The Trust/Foundation will strengthen the inadequacy in the present structures for coordination and integration. It will use information from the targeted research studies and monitoring programme to employ an adaptive management approach to decision-making and implementation of development interventions in the project area.

3.6. The need for integration of all human activities affecting the area is obvious and was recognized unanimously by all those interviewed during the PDF B project preparation phase, ranging from Secretaries of government departments to the wives of local fishermen. To this end, the Trust/Foundation will also support the work of the state-wide and district level CMAs by facilitating collaboration among key federal and state government agencies and local communities on biodiversity conservation activities – monitoring, park management, cross-authorized enforcement. The Trust/Foundation will also facilitate the financial sustainability of the project and biodiversity conservation by mobilizing donor resources and exploring the establishment of a trust fund for the Reserve.

3.7. Leveraged GoTN co-financing will strengthen the state and two district level CMAs as models for the State of Tamil Nadu and India. GoTN co-financing will also improve access to transportation and markets and increase the level of general environmental research and monitoring activities undertaken in the Reserve area. Leveraged UNDP and sector co-financing will support the provision of capital to stakeholder groups participating in project inspired livelihood modification programmes through the development of a GoM micro-credit programme. GEF will play an incremental role in the Alternative by funding costs related to integrating biodiversity concerns into baseline actions, capacity building to enable biodiversity conservation in the buffer zone, and in conducting a demonstration programme on how to modify existing biodiversity-use practices to make them more sustainable. Detailed zoning of priority habitats in the buffer zone will enable stakeholders to incorporate biodiversity conservation into the framework management plan. Stakeholders will be trained in how to integrate biodiversity conservation concerns into their framework management activities in marine resources and forestry with biodiversity conservation efforts.

3.8. Reserve coastal zone management-related actions are the responsibility of GoTN and its CMAs. The CMAs will be strengthened to incorporate biodiversity conservation into its development and implementation of the integrated coastal zone management plan and the framework management plan for the Reserve. The capacity and authority of the state-wide CMA will be strengthened and extended for developing and enforcing the implementation of an

integrated coastal zone management plan with a focus on biodiversity conservation. The Government of Tamil Nadu will strengthen its coastal zone management and pollution control/monitoring efforts in the buffer zone. The capacity of the two district level CMAs will be strengthened so as to ensure that biodiversity conservation activities are fully integrated into coastal zone development activities.

3.9. GEF funding will support the establishment of a systematic research, monitoring and information management programme to support the conservation of biodiversity within the Reserve. The programme will complement existing disparate research and monitoring programmes by establishing a systematic programme of targeted research and monitoring and data management. A Reserve research committee will be formed of representatives from key regional research institutions, targeted, management-oriented research priorities defined and requests for proposals published. The GoI will re-orient existing research funds so as to focus on priorities established by the research committee and GEF will provide some complementary targeted research support. A systematic monitoring programme will be established in collaboration with institutions with relevant capacities. The GoTN has agreed to fund the establishment of a TNPCB office in Tuticorin outside the southern tip of the Reserve to support a more proactive pollution monitoring programme. This will support the adaptive management approach to integrated biodiversity conservation and coastal zone management.

3.10. The GEF alternative will enable coastal stakeholders to develop a more effective property management regime for coastal marine resources. The Alternative is designed so that the GoTN's Fisheries Department substitutes baseline activities for more sustainable fisheries management activities. GEF funding and GoI co-financing will familiarize stakeholders with community management approaches and sustainable resource-use methodologies and enable them to modify existing inappropriate and non-sustainable practices. Intensive consultations among local fisher societies, trawler groups, the FSD, and the CMAs will be conducted to enable local fisherfolk to establish user rights agreements to manage the coastal marine resources as a common property resource. These regimes will be reinforced by a Government-funded reinvigorated official fisheries management policy and practice in which the enforcement of existing rules and regulations will complement user rights agreements. Enforcement will be strengthened through cross-authorization among GoI agencies such as the Coast Guard, the FSD, and the FD-WW.

3.11. The GEF alternative is designed to reduce the pressure on the wild resources to a sustainable, manageable level by enabling stakeholders to develop alternatives to currently unsustainable practices. Barriers related to technology transfer, lack of stakeholder familiarity with alternative options, and lack of access to fair, micro-credit will be overcome. GEF funds will support the development of a sustainable livelihood pilot demonstration programme with two components. The programme has been designed to overcome existing barriers to sustainability by enabling key stakeholder groups (women especially) to develop sustainable alternative livelihoods. Co-financing has been secured for the provision of long-term support of the demonstration programme by local institutions. Co-financing will also support the provision of micro-credit, as and strengthen alternative fuel supply programmes (woodlots, sustainable energy).

4. Scope of Analysis

4.1 The system boundary of this project is defined by the boundaries of the Gulf of Mannar Biosphere Reserve. The Reserve is comprised of a 560 km² core area of coral islands and shallow marine habitat, surrounded by a 10 km wide, 160 km long buffer zone. The Gulf of Mannar Marine National Park (hereafter referred to as the Park) comprises the core area of the Reserve and is made-up of 21 uninhabited islands ranging in size from 0.25 ha to 130 ha and lying between one and four km offshore, surrounded by shallow waters. The buffer zone is comprised of Gulf waters to the south and to the north, the inhabited coastal region of two Districts (Ramanadapuram and Tuticorin) within the State of Tamil Nadu (see Annex VI). The system boundary extends beyond the reserve to include those threats to the Reserve's biodiversity resource and their attendant root causes.

5. Costs and the Incremental Cost Matrix

5.1 The baseline associated with this project is estimated at US\$22,455,000. The GEF Alternative is estimated at US\$ 49,384,000 (including the PDF B of US\$ 194,000) representing a total incremental cost of 26,735,000 (GEF Alternative minus baseline). Of the increment, GEF will finance US\$7,650,000 in support of activities that provide global environmental benefits. The balance of the increment has been leveraged to finance the sustainable development baseline, comprised of US\$1,000,000 from UNDP and US\$ \$16,965,000 from the national Government of India and the state Government of Tamil Nadu. Additional co-financing from the MSSRF, CMFRI and other donors (Banks, private sector, private donations) make up the balance of US\$ 1,120,000 for a total co-financing of US\$ 19,085,000 to the project. Costs have been estimated for seven years, the duration of the planned GEF Alternative.

Incremental Cost Matrix

Cost/Benefit	Baseline (B)	Alternative (A)	Increment (A -B)
Domestic enefits	<ol style="list-style-type: none"> 1. Key government agencies not collaborating on CZM. CMAs new and untested. Conservation objectives not integrated into development planning. 2. Some limited coral reef restoration programmes underway. Afforestation practices alleviate some of the pressure on existing fuelwood sources. 3. Fisher communities receive government transfer payments for housing, etc. 4. Lack of village-level common property management regimes in the buffer zone cause over-exploitation and destruction of fishery/ecosystem. 	<ol style="list-style-type: none"> 1. GoTN's ability to ensure the sustainable use of coastal resources will be strengthened. Collaboration institutionalized; CMA strengthened. 2. Management of coastal and marine biodiversity will be strengthened to ensure sustainable use. 3. Government policies will be strengthened to provide local communities with more resource stewardship responsibilities. 4. Local stakeholders will be more proactive in sustainably managing their economic livelihoods. 	<ol style="list-style-type: none"> 1. The ecological sustainability of development programmes will be enhanced and existing unsustainable practices reduced/eliminated. 2. Long-term sustainable use of coastal and marine biodiversity will be secured for future generations while protecting ecological functions. 3. Reduced dependence on external support for the sustainable use of coastal and marine resources. 4. Marine resources utilized on a more sustainable basis. Biodiversity criteria integrated into resource-use.
Global Benefits	<ol style="list-style-type: none"> 1. Current conservation is inadequate to conserve the Reserve's biodiversity. 2. Enabling policies for community-based conservation are lacking, reducing the effectiveness of management. 3. Insufficient institutional, human, and financial capacity at the Reserve level to manage biodiversity. 4. Existing livelihood options are destructive to Reserve's biodiversity. 5. Local communities lack awareness of broader conservation values 	<ol style="list-style-type: none"> 1. Long-term sustainable conservation programmes for Reserve biodiversity will be established. 2. Government policies will better facilitate the effective conservation of Reserve biodiversity by local communities and stakeholders. 3. Law and policies are strengthened. Legal protection is extended to key species. Capacity of community institutions is strengthened to the point where it is self-sustaining. 4. Communities develop sustainable alternative livelihoods and reduce pressure on wild resources. 5. More targeted awareness raising programmes implemented in and around Reserve area. 	<ol style="list-style-type: none"> 1. Global use, non-use, existence and options values for biodiversity in the Reserve will be secured. 2. A strong, participatory management mechanism is established to improve conservation and sustainable use of Reserve biodiversity. 3. Enabled communities become active partners in conserving globally significant biodiversity. 4. Existing livelihoods are modified. Pressure on biodiversity reduced as people receive tangible benefits from non-destructive livelihood options. 5. Increased awareness of biodiversity values translates into greater active support for conservation.

Costs Component A: Establishment of Statutory Trust/Foundation and LTFM	Baseline (B) Lack of cross-sectoral collaboration in coastal biodiversity management. Lack of adequate and long-term funding for coastal biodiversity conservation and management.	GEF Alternative (A) <i>Adequate and sustainable long-term financing for the conservation and management of coastal biodiversity ensured.</i> Project Coordination Unit operational under the Trust/Foundation for 7 years (project staff, equipment, supplies, space. \$470,000 Feasibility Study for on a long-term financial mechanism. \$50,000. Establishment of Trust/Foundation as legal entity. Board of Trustees sworn-in. \$50,000 Capitalization of Trust Fund \$5,000,000	Increment (A-B) <i>GEF:</i> \$350,000 <i>Private Sector:</i> \$120,000 <i>GEF:</i> \$50,000 <i>GEF:</i> \$50,000 <i>GEF:</i> \$1,000,000 <i>GoI leveraged:</i> \$4,000,000
Component B: Strengthened Operational Park	Sub-total: 0 <i>Park Management:</i> Final legal establishment of Park. Part- time salaries of 20 Park staff for 7 years. Partial implementation of non- participatory management plan. Infrequent, insufficient enforcement patrols. FD-WW: \$600,000	Sub-total: \$5,570,000 <i>Improved Park Management:</i> Final legal establishment of Park. Increased number of Park staff, part -time and full-time. Implementation of participatory management plan. Increased enforcement of park regulations through cooperative agreement with Coast Guard. \$1,100,000	Sub-total: 5,570,000 <i>GEF:</i> 1,450,000 <i>Non-GEF:</i> 4,120,000 FD-WW: \$200,000 Coast Guard: \$300,000

		Additional training for park staff. Study tours on park enforcement/ management. \$450,000	<i>GEF:</i> \$450,000
		Design and development of community-based park management plan. \$430,000	<i>GEF:</i> \$430,000
		GoTN ecotourism programme and GEF-supported biodiversity-friendly eco-tourism guidelines/framework. \$105,000	<i>GEF:</i> \$30,000 <i>GoTN:</i> \$75,000
	Awareness raising through printing and dissemination of posters, regulations, and other materials. FD-WW: 100,000	Threatened species and habitat recovery programme for endemic and endangered species. \$495,000	<i>GEF:</i> \$455,000 <i>GoI:</i> \$40,000
		Targeted research/monitoring programme. \$185,000	<i>GEF:</i> \$185,000
		Improved public awareness raising extended at local, regional, and national levels about conservation of Reserve's biodiversity. \$650,000	<i>GEF:</i> \$500,000 <i>GoI:</i> \$50,000
		Monitoring \$225,000	<i>GEF:</i> \$225,000
	Sub-total: 700,000	Sub- total: \$3,640,000	Sub- total: \$2,940,000 <i>GEF:</i> \$2,275,000 <i>Non-GEF:</i> \$665,000
Component C. Expanded Park Infrastructure	Maintenance of FD -WW headquarters building near park and three old park boats stationed along 160 km-long coastline. \$300,000	Demarcated boundaries and zoning of habitats. \$305,000	<i>GEF:</i> \$305,000
		Park infrastructure improved. Basic infrastructure and administration and management of parks; equipment and upkeep; visitor center. \$970,000	<i>GEF:</i> \$670,000
	Sub-total: 300,000	Sub- total: \$1,275,000	Sub- total: \$975,000 <i>GEF:</i> \$975,000 <i>Non-GEF:</i> 0

<p>Component D: Preparation of a biodiversity overlay for the Reserve</p>	<p><i>No buffer zone biodiversity conservation programme</i></p> <p>The CMA oversees developers' compliance with coastal zone laws without due consideration for impacts on biodiversity. \$70,000</p>	<p><i>Buffer Zone Conservation Programme</i></p> <p>Develop BR Framework Management Plan– ICZM zoning, policy, institutions with GEF-supported biodiversity conservation framework for Reserve \$300,000</p> <p>The CMA oversees developers' compliance with coastal zone laws with full consideration for impacts on biodiversity. \$420,000</p>	<p>GoI, GoTN: \$200,000 GEF: \$100,000</p> <p>GoTN \$350,000</p>
	<p>****</p> <p>****</p> <p><i>Disparate environmental research and monitoring programmes in Reserve area</i></p> <p>ZSI conducts research on coral reef ecology and sea turtles in places other than Reserve: \$250,000</p> <p>Regional universities conducting disparate, isolated research on nutrient recycling and ecosystem dynamics. \$300,000</p> <p>No management plans or efforts for species in buffer zone</p>	<p>Technical assistance to CMAs and government agencies in integrated biodiversity conservation \$200,000</p> <p>Training in economic assessment/ valuation of biodiversity \$100,000</p> <p><i>Targeted research management and information</i></p> <p>ZSI conducts research on coral reefs and sea turtles in places other than Reserve: \$250,000</p> <p>GEF co-financing to establish targeted biodiversity research programme on threatened species and habitats and ecosystem health in the Reserve. GoI financing for most of the research. \$1,500,000</p> <p>Co-funding to develop and demonstrate implementation of biodiversity hotspot management plans: \$1,000,000</p>	<p>GEF: \$200,000</p> <p>GEF: \$100,000</p> <p>0</p> <p>GoTN \$300,000 CMFRI \$250,000 GoI \$350,000 GEF: \$300,000</p> <p>GEF: \$500,000 GoI: \$500,000</p>

	TNPCD enforcement of pollution laws along the coastline of Tamil Nadu. \$350,000	Comprehensive monitoring programme implemented: biodiversity and pollution control management information established \$1,050,000	TNPCB: \$400,000 GEF: \$300,000
	Sub-total: \$970,000	Sub-total: \$4,820,000	Sub-total: \$3,850,000 GEF: \$1,500,000 Non-GEF: \$2,350,000
Component E: Developing and Demonstrating Sustainable Livelihood Options	<i>Existing livelihoods and marine resource use techniques are harmful to biodiversity</i> CMFRI collects fish catch data for selected commercial species. \$250,000 The Fisheries Department (FSD) spends approximately 70% of its resources on welfare oriented programmes for the fishing community and the remainder on overhead expenses. \$7,880,000 Reactive enforcement -related activities of Fisheries Department \$1,495,000	<i>Livelihoods and resource-use techniques are modified to be more sustainable and less harmful.</i> CMFRI collects fish catch data for selected commercial species and establishes fisheries production levels/harvest limits. \$350,000 Conduct in-situ indicator species inventories \$300,000 The FSD modifies its fisheries management programme to include emphasis on sustainable marine resource use. \$9,980,000 Strengthen proactive enforcement/ and management. Provide training on laws and policies, develop specific rules as per local conditions, and undertake a survey and assessment of EEZ resources. \$3,495,000 Strengthen local fishermen coops by establishing community management training programme and implementing for staff and coop leaders; conflict resolution mechanism established. \$250,000	CMFRI: \$100,000 FSD: \$300,000 FSD: \$2,100,000 FSD: \$2,000,000 UNDP: \$250,000

<p>An NGO called Coastal Action Network (CAN) promotes the need for better fisheries management. \$10,000</p>	<p>Clearly define user groups and develop user rights agreements between fish cooperatives and trawler groups \$200,000</p> <p>CAN promotes the need for better fisheries management. \$10,000</p> <p>Develop village marine conservation plans for multiple-use buffer zone conservation agreement for key habitats. \$300,000</p>	<p>UNDP: \$200,000</p> <p>GEF: \$300,000</p>
<p>Independent, private lenders account for the most of the lending in the buffer area and Banks in the project area are providing credit to small scale enterprises, albeit not sustainable and not focussed on the marine environment: \$8,250,000</p>	<p>Existing baseline of Banks and private lenders in the project area is topped up by a non-profit micro-credit programme established to provide credit to small enterprises at reasonable rates. \$9,150,000</p>	<p>Banks, Private donations: \$550,000</p> <p>UNDP: \$350,000</p>

<p>The Rural Development Department's (RDD) programme in the area is currently very small, dealing primarily with water provision: \$1,625,000</p>	<p>Expand RDD's infrastructure support programme to strengthen infrastructure in key reserve areas (feeder roads, docks) \$4,125,000</p>	<p>RDD:</p>	<p>\$2,500,000</p>
<p>No on-going coastal woodland programme exists in the Reserve</p>	<p>Develop coastal woodland and agroforests \$1,000,000</p>	<p>FSD:</p>	<p>\$1,000,000</p>
<p>The Social Welfare Department (SWD) provides basic help for the poorest of the poor. No programme exists to help people overcome barriers to sustainability.</p>	<p>A re-focussed SWD programme provides basic help for the poorest of the poor by promoting sustainable livelihoods. \$1,000,000</p>	<p>SWD</p>	<p>\$1,000,000</p>
<p>The DoA has a programme where new crop and animal breeds are introduced to farmers \$625,000</p>	<p>The DoA crop and animal breeds assistance programme for farmers \$625,000</p>		
<p><i>Inadequate support for alternative livelihoods in buffer zone area.</i></p>	<p><i>Demonstration Programme Components:</i></p>		
	<p>Component 1: Demonstration of less harmful, more sustainable trawling techniques: \$300,000</p>	<p>GEF:</p>	<p>\$300,000</p>

<p>CSMCRI develops replicable technologies to improve seaweed farming/harvesting regimes but lacks technology transfer mandate and know-how. \$350,000</p>	<p>Component 2: Establish women's appropriate mariculture technology demonstration programme. A newly mandated CSMCRI develops replicable technologies to improve seaweed farming/ harvesting regimes and is enabled to transfer technology to stakeholders. \$2,200,000</p> <p>Establish mariculture cooperatives and entrepreneurial training/value addition/ processing and marketing \$600,000</p>	<p><i>GEF:</i> \$850,000 <i>MSSRF:</i> \$50,000 <i>GoTN/GoI:</i> \$950,000</p> <p><i>GoI:</i> \$400,000 <i>UNDP:</i> \$200,000</p>
<p>Sub-total: \$20,485,000</p>	<p>Sub-total: \$33,885,000</p>	<p>Sub-total: \$13,400,000 <i>GEF:</i> 1,450,000 <i>Non-GEF:</i> 11,950,000</p>
<p>Administrative Costs</p>	<p>GEF: \$250,000</p>	<p>GEF: \$250,000</p>
<p>Total: Baseline Total: \$22,455,000</p>	<p>GEF Alternative Total: \$49,190,000</p>	<p>Project Cost: \$26,735,000 <i>Co-financing:</i> 19,085,000 <i>GEF:</i> 7,650,000</p>
<p>PDF B GRAND TOTAL: \$22,455,000</p>	<p>\$194,000 \$49,384,000</p>	<p>\$194,000 \$26,929,000</p>

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Annex B: Project Planning Matrix/ Logical Framework

Project Strategy	Objectively Verifiable Indicators of Performance	Means of Verification	Assumptions
<p>Development Objective : Globally significant coastal biodiversity in a multiple-use area will be conserved and sustainably utilized by stakeholders.</p>			<p>The successful approaches demonstrated by this project will be replicated in other areas, to be complemented by other interventions in order to achieve the development objective.</p>
<p>Project Purpose: Strengthened, statutory Trust/Foundation will ensure that government agencies, private sector, local communities and NGOs all work together in a coordinated way for integrating biodiversity conservation into coastal zone management plans, and take responsibility for their implementation. The FD -WW and local communities will implement a sustainable conservation programme for the Park. The FSD will implement a sustainable fisheries harvest programme successfully in the buffer zone. Inhabitants of buffer zone will apply alternative livelihoods successfully and halt encroachment on protected area resources.</p>	<p>Park biodiversity will be conserved: population dynamics of key species and condition of key habitats will be understood and improving by the end of year 7.</p>	<p>Species/habitat survey information gathered over the 7 years;</p>	<p>Species will recover and flourish in newly protected/managed areas.</p>
	<p>Buffer zone resource use regimes will be on a sustainable footing by end of year 6: community control exerted, new enforcement regimes implemented.</p> <p>Trust/Foundat ion established, cross-sectoral linkages for coordinating and enforcing coastal development activities.</p>	<p>>20 strengthened fisher cooperatives; written policies and reports</p> <p>Regular participation in Trust/Foundation meetings of high-level officials from participating agencies</p>	<p>Local stakeholders will actually change resource use practices in order to enable biodiversity conservation.</p> <p>Board of Trustees will provide needed leadership to overcome sectoral inertia</p>
	<p>By end of year 6, Reserve is managed on an integrated basis through a strengthened Trust/Foundation-enforced framework whereby biodiversity conservation will have been effectively integrated into the productive sector and policy development.</p>	<p>Multi-sectoral reserve management structure adopted; Planning/policy documents; Examples of effective application of integrated approach.</p>	<p>Regional and local governments remain committed to long-term sustainable-use objectives.</p>

Components:	Objectively Verifiable Indicators	Means of Verification	Assumptions
Component A: Trust/Foundation and PCU established, Long-term Financial Mechanism	By end of year 1 GoMBR Trust/Foundation, PCU, and local Panchayat coordination structure established and operating	Minutes from Trust/Foundation meetings/ actual Trust/Foundation document	Government commitment will be sustained throughout the process.
	LTFM study concluded by end of year 2	Final report reviewed and recommendations endorsed by UNDP/GEF	
Component B: Strengthened Operations of Park	Initial US\$2 million co-financing raised by middle of year 3, and first tranche of GEF funds committed	Deposit notes; reports	Bi-lateral funds begin to flow to India again
	Final 2 million in co-financing secured and remaining US\$500,000 GEF funds deposited in increments of US\$ 100,000.	Deposit notes; reports	Additional private sector sources are successfully tapped.
	Full National Park status granted by end of year 1; Cooperative enforcement regimes established.	Official decree/Government notification; Signed agreement with Coast Guard	Decree will be passed by Congress
	Staff capacity improvement: 100% of Park staff in training programs by end of year 3.	Knowledge survey before and after training.	
	Community-based management plan by end of year 2	Completed participatory management plan; signed Memoranda of Agreement.	Trust between Park and stakeholders and consensus among stakeholders can be maintained.
	Ecotourism guidelines completed. Over 1,000 visitors documented first year.	Project documents; Park records	Indians will respond to the invitation to visit this national park.
	Species management plans implemented by end of year 3 for dugong, sea turtles, protection extended for coral and seagrass.	Plans; progress reports, field visits; gazette notification	ZSI will play a key technical and supportive role.
	Coral reef reconstruction demonstration underway by middle end of year 2	Fish aggregation devices/ substrate in place	Additional operating costs will be absorbed by government.

	<p>Sea grass, coral reef core natural areas improving in ecological condition by end of year 4</p> <p>Monitoring program operational by middle of year 2.</p>	<p>Independent ecologist's comparison with initial baseline survey; indicator species survey.</p> <p>Database established; regular monitoring underway.</p>	<p>Seagrass will be able to recover measurably in the short-term.</p>
	<p>By year 3, 20% of schools are participating in outreach/education programmes (field trips, teacher training, curriculum development)</p>	<p>Public surveys/review of literature.</p>	<p>School participation will grow</p>
	<p>Awareness of stakeholders from industry increased by 25% per year beginning year 3</p>	<p>Opinion surveys</p>	
	<p>A 50% increase over initial samples of the number of people aware of biodiversity values and Biosphere Reserve by year 6.</p>	<p>Increase in awareness from baseline awareness defined at the onset of the project</p>	
<p>Component C: Expanded infrastructure for Park</p>	<p>10 Marine Conservation Youth Corps established throughout BR, beginning in year 2 and continuing through year 6.</p> <p>Demarcation of boundaries and Park habitat zoning agreement signed by government and local community by end of year 1</p> <p>By end of year 2 infrastructure is established in Park and equipment supplied and staff trained in its use</p>	<p>Project records/village reports</p> <p>Detailed maps developed/agreements signed/markers in place</p> <p>Mid-term evaluation, field observations; Equipment delivery/training report.</p>	<p>Local residents and park officials are able to reach consensus on boundaries.</p>
<p>Component D: Development of biodiversity overlay for Reserve</p>	<p>By end of year 1, BR framework management plan is completed, and after year 2 annual operations plan will be prepared by PCU Director.</p>	<p>Planning document, records</p>	<p>Old sectoral divisions can be successfully minimized</p>

	Biodiversity conservation capacity of CMA, FSD, DoEF strengthened by Trust/Foundation. Agency staff in biodiversity training by end of year 1.	Training in biodiversity conservation and economic valuation and conservation. Trainee list. Knowledge survey before/after training.	Trust/Foundation's mission will actually be actively supported by key Government and NGO stakeholders.
	Trust/Foundation-inspired, inter-sectoral coordination mechanisms strengthened by end of year 3	Independent review of policy guidelines/Indian Gazette	
	Cross-sectoral authorization of enforcement people by end of year 3	Government notification	
	Two new all-weather boats and communications equipment provided.	Purchase orders; maintenance agreement	
	<i>Targeted Research, Management & Information Programme:</i> Targeted biodiversity research programme established GIS/Information management system at existing institution strengthened.	Research board formed; research needs prioritized in policy statement; research grants awarded. Outputs from system (maps, data); Signed agreement.	Academicians will share data and coordinate on research activities
	Monitoring programme underway: Environmental baseline established (water quality, plant community condition, priority species information) by end of year 2	Database with germane data Habitat map of critical areas in BR	
	Commercial fishery species baseline information	Maps, data sets on catch levels	
	Defined and established cooperative monitoring programme	Institutional agreements Records of field surveys	
	Biodiversity hotspot management plans developed and implementation demonstrated	Planning documents/Work plans/field reports	

Component E: Developing and demonstrating sustainable livelihood options.	<i>Resource-use techniques and Livelihoods are modified to be more sustainable and less harmful</i>		Project implementers will have the patience to win the support and participation of local communities.
	Fisheries production levels and harvest limits established.	Assessment of EEZ fishery/ Official regulations	
	By end of year 7, catch-effort ratio stabilized or increased compared to baseline information	Survey results	
	Revised FSD fishery management programme emphasizing sustainable resource use	Policy papers from FSD/Reports from FSD staff in the field	
	FSD's proactive enforcement strengthened: 75 trained staff and community reps in community-based management and adequately equipped by end of year 3	Participants list and survey results/training reports and materials field visits	Government programmes will adapt to support the new, community-based approach by providing the necessary legal and institutional support to this effort.
	User rights agreements between fishing cooperatives and trawler groups affecting 20,000 fisherfolk in 5 areas completed by end of year 6.	Agreed definition on user groups/Project reports/ signed User Rights Agreements	Local caste issues will not preclude agreements to be reached.
	10 Village marine conservation plans developed by end of year 3, 10 more by end of year 6. Threat and root cause analysis done and priority remediation activities/needs identified	The plans themselves/ village-level interviews	Alternative farming techniques will reduce pressure on wild resources.
	Micro-credit provided to 700 self-help groups of approx. 30 members each in alternative livelihoods: years 2 through 7.	Rupee figures/credit programme established/ surveys of customers	Micro-credit scheme will be accepted.
	Updated, sustainable development-oriented government social welfare programs	Program descriptions; meeting minutes	
	Improved infrastructure: smoothed roads, 2 docking/take-out points developed with refrigeration facilities.	Site visits by reviewers	

	10,000 ha of woodlands and agro-forests planted in buffer zone area.	Site visits/official reports	
	<i>Demonstration Programme Components:</i> Component 1: Demonstration of less-harmful fishing techniques provided to a total of 10,000 fishermen in 5 key localities by end of year 6.	Trawlers fish outside 3 nm limit Training lists; Project progress reports	Authorities will provide ongoing support for the dissemination of these methodologies; Trainees will be receptive to learning and applying new approaches
	Component 2: 600 women per year from Village Marine Conservation Councils trained in the mariculture demonstration beginning at the end of year 2 –end of project.	Training lists/Participant reports/Follow-up surveys of local communities/List of trainees	Stakeholders will actually pursue alternative livelihoods. Seaweed market will remain strong.
	Incomes of targeted fisherfolk stabilized or increased (especially women) from baseline figures.	Survey of new figures	

Activities by Component

Component A: Establishment of Trust/Foundation, Project Coordination Unit (PCU) and Long-term Financial Mechanism

1. Establish statutory Trust/Foundation with oversight powers,
2. Establish PCU and panchayat-Village Marine Conservation Councils;
3. Develop detailed workplan
4. Conduct "Step 1" feasibility study of criteria for the establishment of a LTFM per GEF Evaluation of Conservation Trust Funds
5. Submit study report for review of Government and GEF
6. Develop partnership/co-funding alliances. Make available US\$2 million in co-financing to secure GEF \$500,000 contribution
7. Independent review the effectiveness of the Trust/Foundation.
8. Strengthen the Trust/Foundation statute
9. Secure final US\$2,500,000 for LTFM.

Component B: Strengthened operational management programme for Park

1. Conduct training for managers/community reps
2. Develop and implement habitat restoration programmes.
3. Form biodiversity conservation corps to do this
4. Develop and implement species management programmes.
5. Strengthen key legal and policy measures
6. Confer protected area status on Park
7. Confer protected status on coral species
8. Train staff/community reps in community-based mgmt
9. Identify "problem" groups/hold consultations, and develop enforcement programmes with local community
10. Establish framework and guidelines for restorative ecotourism development
11. Develop reference materials for key stakeholders (government, panchayat, industry, coops, NGOs)
12. Develop curriculum for schools/teacher training
13. Develop innovative traditional cultural programs and promote intensive media campaign (TV, radio, internet, newspaper, magazines)
14. Cultivate participation of local leaders and religious figures
15. Establish 10 Marine Conservation Corps

Component C: Strengthened park infrastructure.

1. Negotiate zoning agreement/management plan with local communities
2. Demarcate boundaries
3. Undertake building and equipment improvements necessary for effective, sustainable management
4. Conduct training in use of equipment/facilities.

Component D: An effective biodiversity conservation programme for the Reserve buffer zone

1. Establish administrative arrangements, information management system, etc.
2. Organize training for CMA staff and integrate CMA activities and Park management actions
3. Develop BR framework management plan – (ICZM – Zoning, Policy, Institutions, etc.)
4. Establish/strengthen inter-sectoral coordination mechanisms (e.g. institutional arrangements among (CMA, FSD, FD-WW, TNPCP, etc...))
5. Conduct training in economic evaluation of biodiversity, and integrated biodiversity management
6. Meetings, field trips, inspection tours.
7. Develop policy guidelines
8. Establish environmental baseline (H2O, species, communities)

9. Establish biodiversity management parameters and ecological community baseline
10. Meetings, field trips, inspection tours.
11. Develop policy guidelines for integrated biodiversity conservation and coastal zone management
12. Establish environmental baseline (H2O, species, communities)
13. Establish biodiversity management parameters and ecological community baseline
14. Develop water quality management parameters/baseline
15. Develop biodiversity hotspot management plans
16. Develop recovery plan for dugong (aerial surveys, habitat quantification and description).
17. Develop management plan for sea turtles (surveys, priority habitat/nesting beaches, etc...)
18. Strengthen the existing GIS/information management system in the region
19. Develop database in consultation with cooperating government agencies and NGOs
20. Strengthen the TNPCB office in Tuticorin to improve monitoring of pollution
21. Establish links among CMA, BR, TNPCB, and industry
22. Demonstrate the implementation of a biodiversity management plan through a pilot project.

Component E: Sustainable livelihood development support for local stakeholders (skills development, information, access to credit)

1. Establish fisheries production levels/harvest limits
2. Survey and Assessment of untapped EEZ
3. Capacity building for fisheries management
4. Modification of fisheries policies by FSD to emphasize sustainable use of fisheries
5. Study tours for CMA, Fishing Dept. officials and, fishing coop leaders
6. Strengthen local fishermen cooperatives/provide training on existing laws and regulations
7. Develop village marine conservation plans
8. Develop user rights agreements on spatial and temporal limits to fishing and conflict resolution mechanism (agreed adjudicator)
9. Develop specific rules as per local conditions (i.e. , type of prevalent equipment, ecological conditions)
10. Clearly define user groups (who is “motorized” and who is “traditional”)
11. Skill improvement and information empowerment
12. Establish enabling micro-credit programme
13. Plant more coastal woodland areas and agroforests
14. Improve infrastructure: build 2 new docking/refrigeration facilities, improve 2 key access roads; improve sewage treatment at two village-sites.
15. Demonstrate sustainable fishing techniques
16. Demonstrate sustainable mariculture
17. Establish mariculture cooperatives; develop cooperative processing & marketing
18. Provide entrepreneurial training/value addition

Annex C: STAP Technical Review

Overall impression

The project addresses a major challenge, namely the conservation of coastal biodiversity of the highest ecological value in a large area subject to considerable pressure from poor populations upon the sole resources that appear to be at their disposal. To meet this challenge, the project follows the only framework which can succeed, namely to combine the necessary protection of the threatened ecosystem and ecological processes with economic and social benefits which will meet the essential need of local people, through providing appropriate institutional, financial and managerial arrangements.

Relevance and priority

The project focuses on marine and coastal biodiversity in an area which is considered as a “hotspot” from this point of view. It appears therefore to be entirely appropriate for the GEF biodiversity component. The continental terrestrial side of the proposed area, which relates to an uncommon dry tropical evergreen ecosystem, has been considerably impacted by human pressure but may still contain interesting patches requiring also protection, particularly near the mangroves.

The project undoubtedly fits well within the objectives of the Convention on Biological Diversity. In this respect, its SSBTTA has recommend specifically to “explore means to incorporate marine and coastal protected areas within a broader framework for multiple use planning, as exemplified by MAB Biosphere Reserves” and this corresponds precisely to the approach advocated here.

The project also appears to fit well within the national strategy of India. In this respect, it should be mentioned that as early as 1979, the Government of India considered the Gulf of Mannar as one of 13 potential sites for Indian Biosphere Reserves. At the regional level, the project will form an indispensable element of the protection of biodiversity in the Central Indian Ocean and, together with the nearby Sri Lanka western coast, it concerns a “hotspot” of the highest priority, rich in corals, dugongs and turtles.

Project approach

The Biosphere Reserve approach which is proposed for the project is entirely appropriate for the following reasons:

- it rightly aims at combining the protection of highly valuable and endangered biodiversity with the legitimate needs of the population within or nearby the area:
- it rightly associates the protection of the coastal marine zone with a sufficient protection and organization of the adjacent coastal land, an approach which is all too often neglected and leads to unsuccessful marine protection through lack of control of terrestrial activities, resulting in water pollution, domestic, agricultural and industrial waste disposal and sedimentation.

- it foresees institutional and financial mechanisms which should enlist the full participation of stakeholders, including local peoples, and the long term sustainability of the project.
- it has a sound scientific following from several well-established local institutions and universities.

Objectives

The major objectives of the project, which are encompassed in the general approach which is adopted, are entirely valid and appear to cover all important implementation issues.

The articulation of the project into five major components, has the advantage of focussing on the key elements of success. Yet it should be clear that they have to be implemented in a fully coordinated way as a single Biosphere Reserve and not as separate units.

The first and second components relate only to the core area of the Biosphere Reserve, constituted by the existing Marine National Park. This calls for a clear demarcation of the Park boundaries, which is apparently lacking at the moment, resulting in encroachments and abusive fishing which will have to be completely eradicated in the future. Demarcation should therefore be considered the highest priority and conducted in appropriate consultation with the stakeholders. The National Park should include the entire islands, through adequate arrangements with private land owners where necessary, and access to these islands should be strictly controlled. Other elements for the strengthening of the park management are properly foreseen, including training and equipment (which implies patrol boats operated under clear authority). The park management staff has to be consistent in quantity and quality with the size of and threats to the area. The provision for targeted biodiversity research and monitoring is most welcome since proper management cannot be achieved on the basis of the very insufficient scientific information available at the moment, and since linkages will have to be made with comparable areas in the world. This element however should relate to the Biosphere Reserve as a whole and not be seen as pertaining only to the Park.

The third component of the project, namely the Biosphere Reserve Trust/Foundation and the Long Term Funding Mechanism appear fully appropriate and consistent with the importance, complexity and stability of the project. It is understood that the Trust/Foundation with the Project Coordination Unit constitutes the managing authority for the entire Biosphere Reserve, including the National Park.

The formulation of a management plan for the Biosphere Reserve as a whole, including appropriate zoning, is essential. In this respect, it should be noted that Biosphere Reserves usually consist of three different zones, namely core areas, buffer zones and transitions areas, the latter being more loosely defined as those surrounding areas where local people cooperate in and benefit from the management of the Biosphere Reserve. The project document, not providing a detailed map and merely defining the Biosphere Reserve by a 10 Km wide strip on both sides of the coast line, leaves open the difficult issue of a fully fledged zoning system with appropriate overlays, not merely for bio diversity but also for other functions. When the zoning is carried out, it will be essential to define clearly the boundaries of the buffer zones on the marine side and, even more important, on the terrestrial side so that people know clearly whether they live within

a buffer zone or in a transition area and what type of activities they can pursue on the land part as well as on the marine part.

This demarcation is particularly important also in relation to the component concerned with alternative livelihood options, the success of which will eventually determine the success of the whole project.

Background and justification

The document provides a general background on the environmental, socio-economic and legislative context. It gives appropriate details on the threats over the area. It falls however somewhat short of details on the actual situation of marine biodiversity, including the dugongs and turtles, and says nothing about possible interesting remnants of the terrestrial biodiversity on the islands and the continent.

The provision of detailed maps, including of the Marine National Park and of its islands, would greatly facilitate a better appraisal of the situation and of the practical issues to be overcome. Otherwise, the justification of the project and its relationship to other efforts need no further emphasis.

Critical analysis of the situation

The existing situation in the area is rather strongly criticized and the threats clearly identified, without however giving specific examples which would illustrate the text. The root causes of degradation of the ecosystem and of its biodiversity lies mainly in the inappropriate actions of villagers and urban dwellers through solid and liquid waste disposal, coral mining, dynamite fishing and trawling, marine specimens collecting, mangrove cutting, dugong and turtle catching ,etc.

These practices are illegal or regulated but control measures are not sufficient and, in the case of poor people engaged in traditional activities, difficult to apply. It should be noted at the same time that some external factors occur, like the severe bleaching of coral due to increased temperatures in 1998, or the sedimentation coming from agricultural or building activities in the water sheds.

Activities

The activities outlined in Annex II are ambitious but consistent with the objectives. It should be stressed however that the overall objective is to ensure the proper management and success of a Biosphere Reserve, and therefore that the various components and activities have to be viewed from that single perspective. This means in particular that the targeted research and monitoring (and the related equipment), the zoning, the education and training or the development of livelihood opportunities should be seen as a whole and not separated for instance between the National Park and the rest of the Biosphere Reserve.

The presence of a permanent research and observation station within the national park, possibly in Krusadai Island, would be of significant advantage, and would constitute a visible symbol of

the importance attached to the area. Cooperative arrangements for such as structure might be made with the meteorological and oceanographical services.

National priorities and community participation

The project clearly relates to national priorities, including those related to the GEF Eco-development project and reflects the importance currently attached by the Government of India to conservation and sustainable development.

Consultations have already taken place with local authorities for the formulation of the project. It should be stressed constantly that the success of the project will depend on the intensity of these consultations during the further development and implementation phases, particularly as regards zoning, regulation setting, education, economic benefits (micro-credit, aquaculture, salt production, pearls, ecotourism, tree planting, etc...), and in overall management of the Biosphere Reserve as a territorial unit.

Institutional arrangements

The provision for a Biosphere Reserve Trust/Foundation together with a Long Term Funding Mechanism, with an overall Project Coordination Unit (covering the National Park) and a Board of Trustees representative of all stakeholders (Tamil Nadu Government, Central Government Departments – which could perhaps include the Indian Navy – as well as appropriate NGO's like MSSRF) seems to constitute an original and valid pattern for a complex project of that type. The operation of this mechanism should however make sure that not only a top-down approach is followed but that satisfactory arrangements are made for a parallel bottom-up approach through which the views and expectations of the village councils and of the panchayats are properly taken into account.

Time frame

The building up of the Long Term Funding Mechanism and more generally the full implementation of a project of that kind requires a long period of launching, development, monitoring, adjustment and insertion into the local framework. A period of seven years is therefore the minimum to consider.

Funding

The indications given in the project document appear to be realistic and appropriate. Although this is likely to remain marginal, it is probable that success in implementing such a coastal Biosphere Reserve will attract funding from interested international NGO's and foundations for research and training activities in the future.

Replicability

At the moment, very few projects concerning the conservation of coastal biodiversity can be considered unquestioned successes. The application of the Biosphere Reserve concept to an area of sufficient bioregional size is an innovative approach and the institutional arrangements

foreseen constitute also a most interesting experiment. There is no doubt that the project can provide considerable demonstration values for other coastal regions, which represent probably the most difficult challenge for biodiversity conservation and land water management. Coastal regions in the northern coast of Cuba, in Belize, in Papua New Guinea, in Indonesia or in the Philippines for instance could benefit from the experience acquired in the Gulf of Mannar.

Sustainability

This very important issue should be resolved through both the Long Term Funding Mechanism and through the participation of local villages in well designed educational activities. There could be however two dangers for the future which have to be watched over time. The first one would be an excessive accent on the ecodevelopment side of the Biosphere Reserve, which would place the conservation objectives in and outside the National Park on a second rank, a self defeating process which has taken place in other instances. The second would be that the benefits arising from the Biosphere Reserve to the local people who are directly associated to it eventually attract other people from the interior, thus increasing the population pressure, again a process which has precedent, and which can be partially avoided through proper zoning and delimitation of the buffer zones.

Additional comments

Two points may be added as final comments.

The first one is that the marine ecosystem of this Indian Biosphere Reserve has much in common with the nearby north west coast of Sri Lanka and that some cooperative arrangements would appear highly desirable with the authorities concerned, particularly for management of dugong and turtle populations.

The second comment is that although India maintains a number of national Biosphere Reserves, it has not yet proposed any for participation in the World Network of Biosphere Reserves which is being developed, in line with the strategy adopted in Seville by the 1995 international conference on Biosphere Reserves convened by UNESCO. Participation of the Gulf of Mannar Biosphere Reserve in this exchange of information network would be beneficial to the project, and would seem all the more desirable that the international community through GEF provides support to this important site.

Michel Batisse

Annex D: Threat/Root Cause Analysis

Threat 1: Habitat Destruction (Coral reefs, Seagrass Beds, Mangroves)

Habitat destruction is the most serious threat to the long-term viability of the Park's globally significant resources. On the whole, it is the result of illegal or inappropriate resource-use actions taken by villagers located in the buffer zone outside the Park. Illegal coral mining, done by hand on a small-scale, has gradually stripped most of one island's coral and threatens to do the same in other parts of the Park. The coral reefs are also threatened by the indiscriminate anchoring of small fishing craft on the reefs. Seagrass beds are degraded by inappropriate bottom trawling practices, notably by local mechanized fisherman dragging the sea bottom in the shallow waters, destroying much of the substrate where these grasses can take hold and grow. Much of the mangroves are under being cut as a source of fuelwood.

Root Causes	Proposed Actions
<ul style="list-style-type: none"> • Lack of integrated management of Park and surrounding buffer zone. 	⇒ Establish an integrated management programme for Park and surrounding areas
<ul style="list-style-type: none"> • Inadequate enforcement of existing laws against coral mining in National Park, against dynamite fishing <ul style="list-style-type: none"> - Gaps in existing legal and policy framework hinder enforcement 	⇒ Strengthened enforcement at the community level through cooperative agreements and targeted strengthening of enforcement capacity of National Park and Fisheries Dept. ⇒ designate coral species as being threatened; pass final legal declaration establishing the Gulf of Mannar Marine National Park ⇒ Strengthen infrastructure (equipment, boundary demarcation, etc.)
<ul style="list-style-type: none"> • Insufficient infrastructure for National Marine Park. 	
<ul style="list-style-type: none"> • Inadequate level of proactive management <ul style="list-style-type: none"> - Unfamiliarity with how to minimize negative impacts from alternative income generating activities (e.g., aqua farming and salt production) 	⇒ Establish proactive and adaptive management regime; determine existing situation and work to improve conditions ⇒ Establish systematic monitoring program ⇒ Develop training and demonstration programmes ⇒ Feed lessons learned regularly into dynamic framework management plan through Trust/Foundation
<ul style="list-style-type: none"> • Lack of community support/involvement in management activities <ul style="list-style-type: none"> - The Park has not been sufficiently discussed with local communities, contributing to encroachment 	⇒ Training and infrastructure support for enforcement; Development of baseline information on threatened/endangered species – coral, dugong, sea turtles (i.e., health, distribution, and species composition). ⇒ Establish boundaries in agreement with stakeholders; physically demarcate boundaries; operationalize the Park management by developing a participatory planning framework ⇒ delineation of critical habitats in the coastal ecosystem (turtle nesting areas, sea grass beds, mangroves); Integration of sectoral sustainable development programmes
<ul style="list-style-type: none"> • Insufficient awareness of cumulative impacts 	⇒ increase awareness in a strategic, targeted manner
<ul style="list-style-type: none"> • Lack of basic, regional, integrated planning framework 	⇒ Establishment of regional, integrated planning framework to better guide regional development activities
<ul style="list-style-type: none"> • lack of alternative livelihood options, leading to unsustainable resource-use practices 	⇒ Provide alternative, sustainable livelihoods to remove destructive pressure from priority habitats

Threat 2: Over-harvesting of marine resources

The waters in the buffer zone around the Park suffer from the growing cumulative impacts of over-harvesting of marine resources which threaten to disrupt the ecological balance supporting globally significant biological resources in the Park and the Reserve as a whole. Currently, in the waters comprising the buffer zone around the Park, there is little to no control exerted over how many fish are harvested and who harvests them. Consequently, the larger mechanized boats are catching most of the fish, precluding the smaller, traditional craft from catching their share. This inequitable and unsustainable situation in turn forces traditional craft to take up other destructive practices to make ends meet, such as mangrove cutting and coral mining in and around the Park. The Reserve’s seaweed, which plays an important role in stabilizing the near-shore marine ecosystem, is being over-harvested by local villagers (primarily women) for whom this is their only source of income. These same women have no awareness of how to increase their income by other sustainable means, such as cultivating seaweed, rather than taking it directly from the wild.

Root Causes	Proposed Actions
<ul style="list-style-type: none"> • Lack of community management capacity/effective property regimes to guide fisheries management lead to conflict between artisanal fishers and mechanized fishers. 	<ul style="list-style-type: none"> ⇒ Strengthen fishing societies to enable them to be more proactive in managing the fishing resource, to build strong, de -facto property regimes. Develop user agreements between trawler and artisanal fishers ⇒ Strengthen community management capacity through by requiring more community input; strengthening existing community institutions (panchayats, coops) and developing partnerships for sustainable management of resources (user rights agreements).
<ul style="list-style-type: none"> • Insufficient enforcement of existing rules and regulations. Fishers must have a government license to fish, but the Fisheries Department does not limit the number of licenses issued, nor does it enforce the regulation sufficiently leading to open access regime. • Inappropriate technology/methods used <ul style="list-style-type: none"> - Unfamiliarity with more sustainable harvest methods/techniques -Lack of stakeholder understanding about impending losses 	<ul style="list-style-type: none"> ⇒ Doing more with less by strengthening enforcement capacity of key institutions through training programmes and formulation of new, collaborative efforts; cross-authorize staff from agencies (coast guard, forest officers, wildlife officers); adequately train and equip staff; develop sustainable funding mechanism for ongoing enforcement. ⇒ Develop agreements for appropriate use of technology (i.e., temporal and spatial) ⇒ Demonstrate more sustainable methods; education/awareness programmes
<ul style="list-style-type: none"> • Lack of alternatives livelihood options leads in part to too many people fishing or harvesting fuelwood in sensitive areas. • Local research institutions lack the capacity to bring appropriate technologies from the lab to the potential entrepreneur. <ul style="list-style-type: none"> - Unfamiliarity with options/lack of access to information • Inadequate and unfair credit arrangements keep 40% of fishers in perpetual state of debt, increasing pressure on resources. 	<ul style="list-style-type: none"> ⇒ Development of alternative livelihoods in as ⇒ Strengthen community woodlot programmes in problem areas ⇒ Introduce alternative energy supplies ⇒ Top-up local research institution’s work with a sustainable development and outreach, extension expertise ⇒ Enable people, through demonstration programmes and training, to choose another profession ⇒ Establishing a fair, enabling micro-credit programme to provide small amounts of capital to fund alternative livelihood efforts ⇒ Introduce cooperative, self-help groups to access micro-credit

Threat 3: Localized pollution

Localized pollution outside of the southern tip of the buffer zone represents a potential threat to the Reserve's biological diversity. India has national and state pollution control laws as well as institutions to enforce those laws. Development underway in the southern part of the Tuticorin district is of concern to the long-term management of the reserve. Still, pollution laws are being followed and no discernible impact upon the Park's biodiversity has been detected from any resulting pollution. What is required is a more active outreach, prevention and monitoring programme to work with the primary point sources in the area (a major harbor, a coal-fired power plant, a chemical plant, and the salt pan industry) to develop a strict monitoring and cooperative prevention and management programme.

Root Causes	Proposed Actions
<ul style="list-style-type: none"> Lack of management information to support a more proactive enforcement programme 	<ul style="list-style-type: none"> ⇒ Development of a sustainable water and air quality monitoring programme appropriate for the Reserve as a whole.
<ul style="list-style-type: none"> Inadequate enforcement/monitoring of existing laws and policies Lack of cooperative/collaborative relationship with industry outside of the reserve. Lack of sufficient legal provisions for participatory discussions related to industrial development. 	<ul style="list-style-type: none"> ⇒ Lack of baseline data/specific data on water quality ⇒ Systematic water quality monitoring within the Biosphere Reserve and use of results in decision making ⇒ Development of collaborative pollution prevention/control programme between industry and GoM Biosphere Reserve Trust/Foundation. ⇒ Development of participatory BR management mechanism
<ul style="list-style-type: none"> Lack of integrated planning framework for local development Lack of awareness of the importance of the biosphere reserve 	<ul style="list-style-type: none"> ⇒ Develop integrated planning framework to guide development in buffer zone area. ⇒ Raising the level of awareness and representation.

Annex E: Project Implementation Arrangements/Institutional Summary

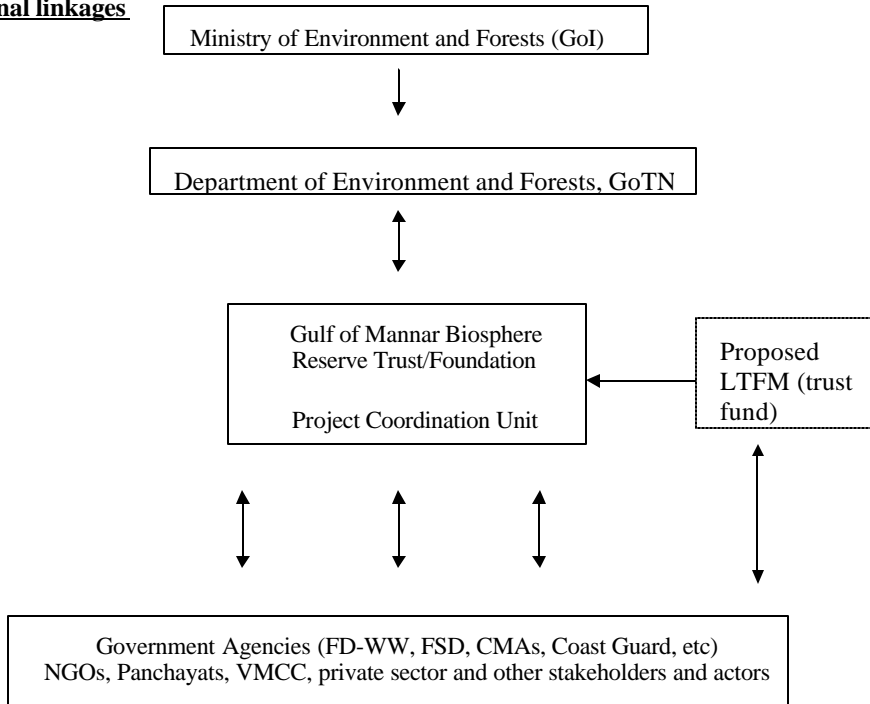
Table 1: Project Execution Responsibilities

Institutions Components	Trust/ Found ation/ PCU*	FD- WW	FSD	DoEF	MSSRF	Panchayat	NGO/ Private Sector
Component A	X	X	X	X	X	X	X
Component B	X	X	X	X	X	X	
Component C	X	X					
Component D	X		X	X		X	X
Component E	X	X	X	X	X	X	X

Note: “X” indicates responsibility for implementation of the related activity.

* The Trust/Foundation will be the statutory authority responsible for the development and implementation of the integrated biodiversity conservation and coastal zone management plan. The PCU will be responsible for carry out project implementation activities under the Trust/Foundation. The Trust/Foundation will coordinate the implementation of the plan by government agencies and other actors.

Institutional linkages



Institution	Role in project
Government Agencies	
The MoEF is India's national focal ministry in the field of biodiversity and environment. It is entrusted with the responsibility of overall policy planning, interstate coordination.	: The Ministry will co-fund some of the activities under the project and is UNDP's national counterpart responsible for executing the project.
The DoEF is responsible for the administration of state environmental policies.	: The DoEF and GoTN would be responsible for providing governmental authority to the Gulf of Mannar Biosphere Reserve Trust/Foundation for executing the project.
The Wildlife Wing of Tamil Nadu Forest Dept (FD-WW) is responsible for managing the GoMMNP, protecting and conserving wildlife habitats, enforcing the Wildlife Protection Act (1972), and generating awareness. The Forest Department as a whole is responsible for the management of forest resources, and the promotion of community, extension forestry.	: The FD-WW will be co-fund certain project activities. It is responsible for the long-term management of the Park. The FD as a whole will afforest degraded areas in the buffer zone, promote social forestry, and establish shelter belts.
Fisheries Dept. of Tamil Nadu (FSD) is responsible for managing the state's coastal fishery. It enforces marine fishery regulations and executes various fisher folk welfare schemes.	: Under the project, the FSD will co-fund substantial sustainable baseline-related activities. The FSD will enhance fisheries management in the buffer zone and will play a key role in developing coastal fishery property regimes and strengthening fisher coops for post-harvest processing and marketing. The FSD will also provide staff to the project PCU.
The state-wide CMA is responsible for developing and enforcing an integrated coastal zone management plan, supported by district-level CMAs that are responsible for enforcing the GoI's Coastal Regulation Zone Notification	: The Trust/Foundation will be responsible for integrating biodiversity conservation into the coastal zone management plan, and provide support to the CMAs for enforcing its implementation.
The TNPCB, working with the Directorate of Environment, is responsible for ensuring the compliance of pollution control norms of major point sources of pollution on the edge of the Reserve.	: The TNPCB, as a participating member of the Trust/Foundation would ensure establishment of a pollution monitoring and regulation programme specifically for the Reserve.
The DoA is responsible for administration of agriculture sector policies. The DoA's overall objective is self-sufficiency in food production. In the GoMBR, the DoA supports a farmer extension and subsidy programme to encourage the growing of special crops.	: The DoA will co-finance some sustainable development-related activities under the project related to soil and water conservation, treating problem soils, and promoting integrated farming systems and technology transfer.
Panchayat are local village councils that, by Indian law, are given significant autonomy in managing the affairs of village life.	: Panchayats will be the village level partner entities for all project-inspired community-related activities.

Research Organizations

- The CMFRI: 1) monitors and assesses status of the exploited and unexploited fish stocks in the Indian EEZ; 2) develops suitable technologies for sea farming of finfish, shellfish and other cultivable marine organisms; 3) evaluates ecological and sociological aspects of capture and culture fishing (marine) operations. : The CMFRI would be involved in capture and culture fishery survey and monitoring of fish stocks and for promoting alternative livelihoods.
- Madurai Kamaraj University has a centre for Marine and Coastal studies concentrating on corals and coral reef ecology. Major research programmes include monitoring of corals and coral associated ornamental fish. : The Centre will be responsible for studies on coral reef ecosystems, ornamental fish conservation and breeding
- The ZSI Marine Biological Station-Chennai surveys and monitors endangered marine mammals. They have taxonomic expertise and undertake quantitative coral reef surveys. : ZSI will work closely with the FD-WW to develop and implement the species and habitat management plans in the Park.
- Center for Marine Biology –Annamalai is an educational institution specialising in basic marine biology research. Programmes in GOMMBR include study of invertebrates, nutrient recycling and mangrove ecosystems. : The Center will conduct targeted research and monitoring on the mangrove ecosystems within the Park itself.
- CSMCRI – Mandapam’s major activities include research on cultivation of seaweeds for industrial uses and development of highly productive strains. Seaweed resource survey extension and training. : CSMCRI will play a central role in the development and promotion of alternative livelihoods under the project. Seaweed culture technology demonstration and extension activities would be carried out by CSMCRI.
- Bharathidasan University Tiruchirapalli The School of Earth Sciences has expertise in GIS and remote sensing technology in this area. : The School would work with the Institute of Ocean Management Anna University, Chennai, to develop the information management and utilization system for the Park.
- The Tamil Nadu Veterinary and Animal Sciences University’s Fisheries College and Research Institute is an educational and extension institution that has carried out extensive studies on fishery resources. : This institution will work closely with the FSD and the Trust/Foundation to develop a sustainable fishery technology demonstration module under the project.

NGOs

- The M.S. Swaminathan Research Foundation (MSSRF) is committed to a mission harnessing science and technology for environmentally sustainable and socially equitable development. The MSSRF’s Eco-technology Centre has : MSSRF will work with Government and academic institutions to develop a GIS programme to facilitate pro-active management of the Park. MSSRF will provide expert guidance to the project’s development of

expertise to research, develop and diffuse environmentally sound technologies.

alternative livelihood demonstration modules. MSSRF will also work with NGOs to ensure that genders are treated equally under the project.

PRADHAN (Professional Assistance for Development Action) is a professional development organization in the of natural resource management field 1983.

: PRADHAN would assist in re-vitalizing local management systems for community-owned marine resources by creating self-help groups and micro credit programmes to support the alternative livelihood development.

The WWF – India implements various Awareness generation and Conservation education activities in the region collaborating with state wildlife Department.

: The WWF will continue to promote these activities with the Arumbugal Trust and in collaboration with the GoTN.

RUSSET is an agricultural NGO working in rural Tamil Nadu.

: Russet has a network of field staff doing agricultural extension work focussing on marketing farm products. This expertise would be put to use in helping develop marketing schemes for marine products.

Arumbugal Trust is a local environmental education NGO in southern Tamil Nadu.

: Arumbugal Trust specializes in promoting conservation education through popular folk dances and street plays and would use this expertise under project-supported awareness-raising activities.