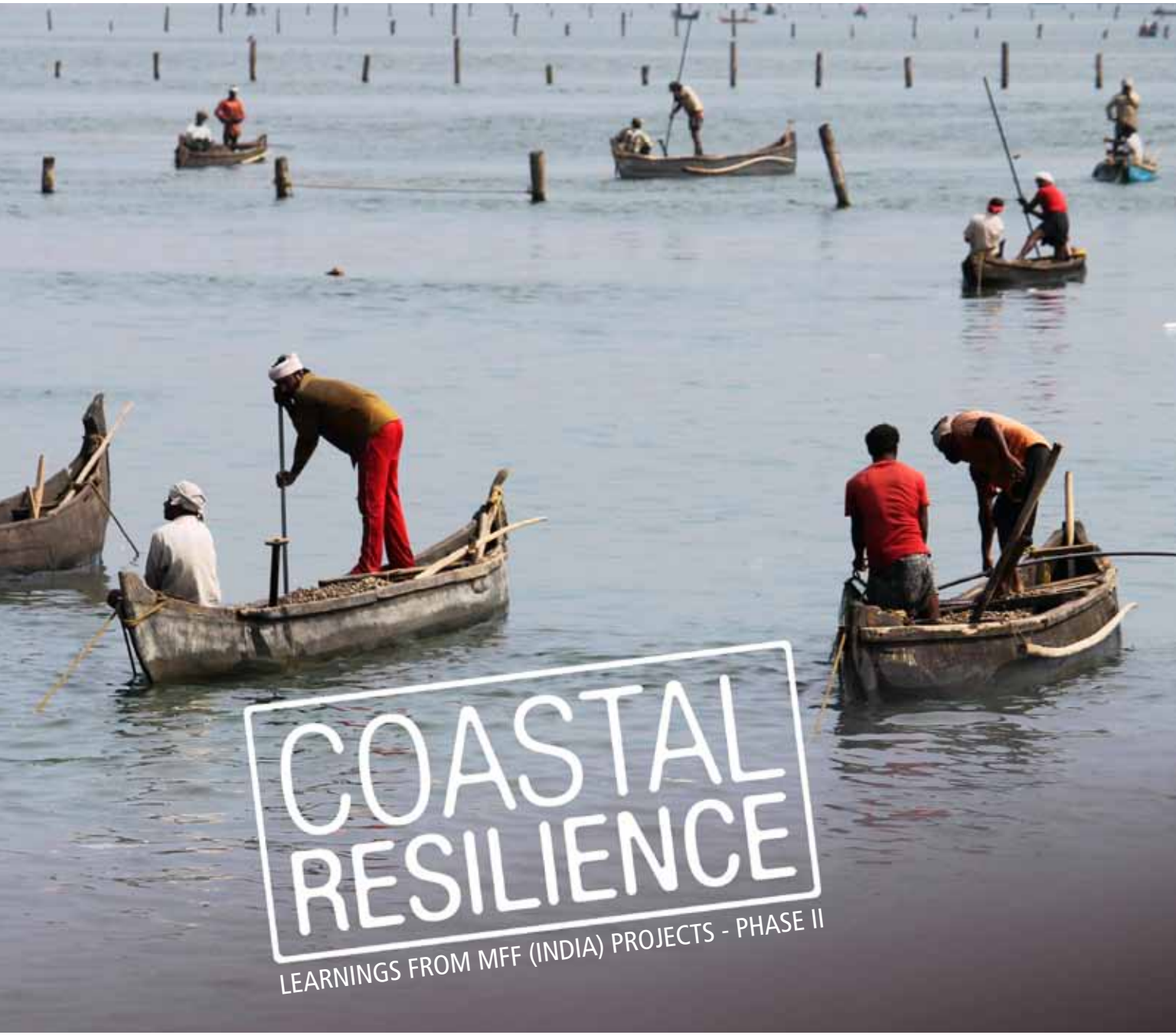
COASTAL
RESILIENCE
LEARNINGS FROM MFF (INDIA) PROJECTS - PHASE II

INDIA 2014

Produced by the Mangroves for the Future (MFF) India
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COASTAL RESILIENCE

MANGROVES FOR THE FUTURE SINCE 2006

MEMBER COUNTRIES

BANGLADESH • CAMBODIA • INDIA • INDONESIA • MALDIVES • SEYCHELLES • SRI LANKA • THAILAND • PAKISTAN • VIET NAM

OUTREACH COUNTRIES

MYANMAR • TIMOR-LESTE

अशोक लवासा
ASHOK LAVASA, IAS

सत्यमेव जयते

सचिव
भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Secretary
Government of India
Ministry of Environment, Forests & Climate Change

Foreword

India has been part of the Mangroves for the Future (MFF) regional initiative since 2007. This regional coastal and marine initiative, conducted by IUCN India in collaboration with the Ministry of Environment, Forests and Climate Change, encourages investment in coastal ecosystems and strives toward a healthier, more prosperous and secure future for coastal communities of India.

During the period 2011-2014, the MFF (India) Programme has completed seven small grant projects, one large grant project in the Indian Sundarbans, one regional project in the Gulf of Mannar and also conducted two regional symposiums. During this period, five illustrated knowledge products have been published. These products have contributed to improving our awareness of coastal and marine biodiversity, critical threats and proposed management options. These aforesaid achievements have been synthesised in the document "Coastal Resilience Learnings from MFF (India) Projects-Phase-II"

The document covers seven small grant projects including: mangrove restoration in seven hectares and creation of mangrove committees for their management in Odisha; creating awareness and studying the mangrove forest characteristics in Maharashtra; increasing the livelihood opportunities for women around Bhitarkanika mangroves; developing a conservation strategy of sea-grass meadows in Gulf of Mannar; providing a management framework based on wise use principles for the Vembanad Kol in Kerala; understanding the distribution of whale sharks along the west coast of India and developing conservation strategies; and providing strategies for conservation of Gastropod shells that are in trade. The regional project in the Gulf of Mannar seascape examined the status and threats to critical habitats like the sea-grass meadows and coral reefs and charismatic marine fauna like dugongs and cetaceans. The large grant in the Indian Sundarbans has developed: a) alternative livelihoods that include skill training and institutional strengthening; b) a benchmark report on Mangroves of the Sundarbans and their relations to micro-climatic factors; c) the possibilities of establishing micro-finance for the mangrove-dependent communities; d) improved resilience of local communities to natural disasters by developing disaster risk reduction plans and training the locals;

and e) providing medical camps for the local communities.

This document is an important and integral step to ensure that actions taken can be understood by the widest set of stakeholders and replicated. It summarizes the extensive learnings from these projects and their associated activities. It focuses on successes, as well as the challenges that have arisen during the course of project implementation. I am happy to note that MFF projects and activities continue to be policy-relevant, people-focused, partnership-based and investment-oriented.

I have the pleasure in presenting the document during the United Nations Decade of Biodiversity and congratulate all those involved in bringing out this publication, in particular Shri Hem Pande (Additional Secretary and Chairman NCB India) and Dr JR Bhatt (Adviser and member Secretary NCB, India) for guidance in preparing this document.

(Ashok Lavasa)

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N. M. Ishwar, IUCN

In 2006, the Mangrove was taken as the iconic symbol of a call to action in response to an environmental crisis, and was the centre point of Phase I actions. The projects in Phase II focus on leveraging science to support policy.

Working towards Coastal Resilience

India's coastal communities are amongst the most vulnerable in the world. Living on the periphery of land and water, these communities rely on their natural environments for sustenance and livelihood. They have one of the world's lowest carbon footprint, but bear the brunt of man-made climate change.

The 2004 Indian Ocean Tsunami had devastating effects and was a stark showcase of the extent of vulnerability of South Asia's coastal communities. Livelihoods and marine ecosystems with little resilience were destroyed. Around 20 million people live along India's 8113 km coastline. The destruction of the coast impacts the country's rich biodiversity, and poses a threat to the sustainability of coastal communities[1].

Mangroves for the Future (MFF) rose to this challenge, and in its first phase of operation, discovered that a little can go a long way. Communities and coastal ecosystems are in a situation of imbalance. Human actions, the forces of urbanisation, industrialisation and the threats of climate change have created a situation of uncertainty. MFF Phase I was a process of documentation of both learning and action. It brought together traditional knowledge and science and created common consensus for change, conservation, protection and rehabilitation.

In order for change to be sustained, it has to be instutionalised and up-scaled. Policy and legal frameworks are the ultimate goals to protect change. To make this possibe, exhaustive due diligence and management action plans have to be developed.

In Phase II, MFF looked to develop a longer term ambition, with the understanding that disaster relief and rehabilitation can only be effective if they are inherently both reactive and precautionary. Coastal resilience will require a broader understanding of the seascape. The projects selected for Phase II centre around scientific, evidence-based inputs that can contribute towards broader sustainable policy discussions.

Additionally, the projects in Phase II bring to light the distance between laws and the ecosystems they are supposed to conserve. Frameworks to protect marine life and India's coastal ecosystem have been put in place. The National Environment Policy (2006), the National BioDiversity Action Plan (2008), The Ramsar Guidelines, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are all examples of domestic and international conventions to which India is party. They provide a bounded framework for action. MFF seeks to bridge the gap between laws and the communities they seek to protect.

Policy is the result of dynamic process. All projects selected in Phase II focus on developing up-to-date qualitative and quantitative data that will feed the process of understanding and managing sustainable development for coastal ecosystems across India and the region.

CRISIS ON THE COAST
Climate Change
Salinity
Urbanisation
Industrialisation
Threat to Marine Ecology and Coastal Communities

INTERVENTION
Mangroves for the Future
Phase 1: 9 Small Grant Projects
Research
Effects on
Ecology
Livelihood
Action
Phase 2: 7 Small Grant Projects
Research
Actions of
Precaution
Response
Knowledge
Regional Fisheries Symposium, Kerala, India
Policy
1 Large Grant Project
1 Regional Project
LOCAL
ECOSYSTEM
TRANSBOUNDARY

MFF Phase II, Extending Coastal Resilience

In 2004, the tsunami that hit the east coast of India took the lives of 230,000 people, with 45,000 left missing[2]. In 2009, cyclone Aila left 500,000 people homeless[3]. Weather variability has been commonplace for coastal citizens, but the extremes are becoming more frequent, and resilience developed in response to predictable change is being weakend. These extreme weather events, without prepared systems of response, have resulted in degradation, erosion, and irreversible ecosystem loss. Communities have been left to fend for themselves with limited resources and weak adaptive capacity.

In 2006, Mangroves for the Future (MFF) was launched in response to an immediate crisis - a fragile coastline that was in danger of irreversible change. MFF is present in 10 countries, all of which are guided by a National Strategy and Action Plan (NSAP) and overseen by a National Coordination Board (NCB). In India, the chair of the NCB is Additional Secretary of the Ministry of Environment, Forests and Climate Change, (MOEF&CC), Government of India, reflecting India's high level of ownership on the issue of coastal protection, conservation and management. In 2008, MFF - India put out a call for small grants that were to be catalytic in nature. The shortlist of 9 small grant projects focused on action research in areas of livelihood development, coastal and marine biodiversity, and information and knowledge dissemination. Between 2008 and 2011, these action research projects catayzed conversation between communities affected by change and those that were in charge of directing responses to that change.

What came out of Phase I was the ability of focused support to foster changes in understanding. Science and experience can work together to create informed robust strategies for coastal management. Phase I also brought out the similarities across the areas where MFF is present, nationally and regionally. Coastal ecosystem management shares likenesses across the South Asian and South East Asian seascapes.

The next steps of MFF were multidimensional, with an ultimate policy focus, bringing together isolated projects into a broader context. MFF's Phase II took on a larger philosophy of the seascape of connected experiences and triggers. Phase II focused on developing strong scientific evidence-based discussions. MFF's Phase III will translate this by working with coastal communities to help them understand the legal frameworks in place to protect them and their immediate environment.

Whether it is the trade of gastropod shells for commercial retail, the degradation of seagrass beds or the need for alternative livelihoods for communities who have relied on mangrove forests, all of these issues cross-cut national borders. In Phase II, the strong participation and local level of ownership were reflected in the cofinancing that was put forward by project partners. Of approximately INR 7.6 million of cofinancing, over 20 percent was contributed by project partners.

In Phase II, in addition to 7 small grant projects, MFF took up the question of the Sunderbans as a large grant, multi-year project. A Regional Symposium on fisheries was put into place. Additionally, MFF's intervention in the Gulf of Mannar focused on the cross-border impacts of biodiversity and livelihoods. This was done in cooperation with Sri Lanka, so that shared realities across the seascape could be brought into greater focus. Together, this second phase portfolio reflects the growth of MFF and its commitment to work towards real solutions for sustainable actions.

MFF understands that in order for projects to reach out to a wider audience and leverage their full potential as catalysts for change, there needs to be substantive dissemination of knowledge and application of that knowledge. The MFF Secretariat has undertaken this responsibility throughout the consecutive phases of the project. MFF has developed workshops and specific knowledge products to foster active understanding and interest in coastal protection. MFF's publications ensure that local outputs can contribute to global outcomes for sustainable development.

CREDIT

Scoping Policy for Resilience

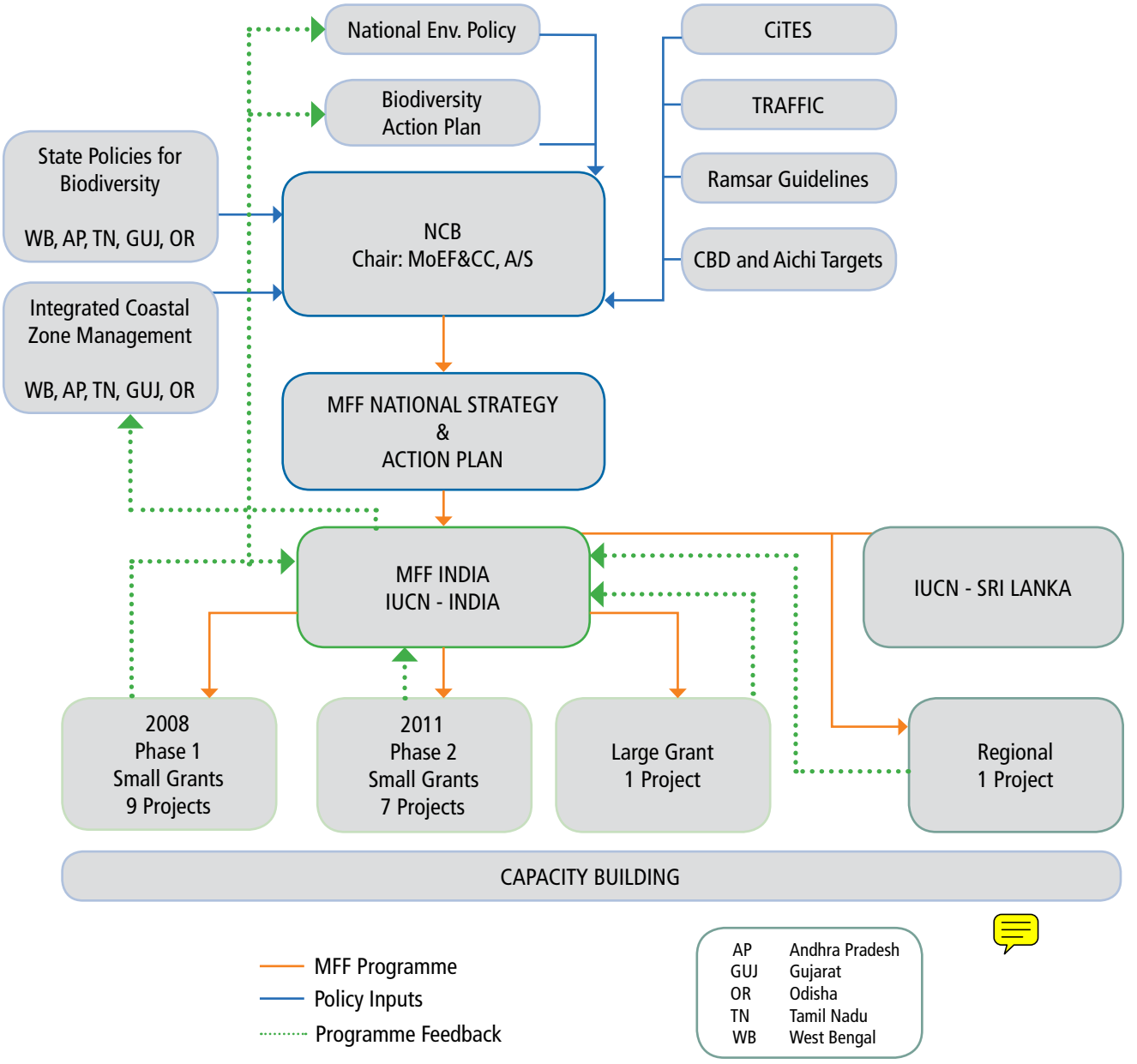
The structure of MFF India, with the National Coodinating Body (NCB) acting as a guiding council, chaired by the Additional Secretary of the Ministry of Environment and Forest and Climate Change (MoEF&CC), ensured that positive project learnings could be replicated. It was this programmatic structure and the success of Phase I Small Grant outputs, that led to the decision to continue MFF India projects with the aim to feed into policy advocacy and decision-making.

The focus of MFF is to support different projects that would not necessarily receive traditional funding, and those which can broaden the issues that are part of developing an understanding of the coastal ecosystem. The first step in such a process of evidence-based policy information is site-specific case studies. These case studies contribute to consolidation of a subject-specific knowledge base through research, and better understanding of the issues that need to be taken into consideration when developing multi-stakeholder management plans for the seascape.

New information and feedback on the implementation of existing policy allow for stronger frameworks for management and deployment. For these unique project areas, MFF India acts as an incubator to help facilitate perspectives across multiple actors. Towards this aim, Phase II focused on the ability of the projects to *'create an impact on policy at National/State/District levels for Integrated Coastal Zone Management (ICZM)'*. The successful projects, such as *Commercially important Gastropod Shell Resources,* were selected by the NCB for their ability not only to meet the requirement of contribution towards ICZM measures, but also for their unique and far reaching concepts.

MFF India works with relevant stakeholders, (both at the national and state government levels) and the implementing actors to ensure that the gaps between policy development and practice are minimal. Phase II reflects how best to evolve from evidence-based findings to informed policy choices. Additional to the Small Grants, MFF has taken up the task of developing projects that broaden information on issues facing the seascape. This discussion includes bringing together stakeholders who share ecosystems, despite being located across geographic boundaries. The Regional Project in the Gulf of Mannar between IUCN Sri Lanka and IUCN India is one such example.

MFF India's awareness programmes, stakeholder workshops and knowledge products help to disseminate project findings. This encourages understanding of the issues affecting the seascape, the far-reaching consequences of actions that can negatively impact this ecosystem, and how best to avoid and manage any conflicts in resource sharing through evidence-based decision-making.

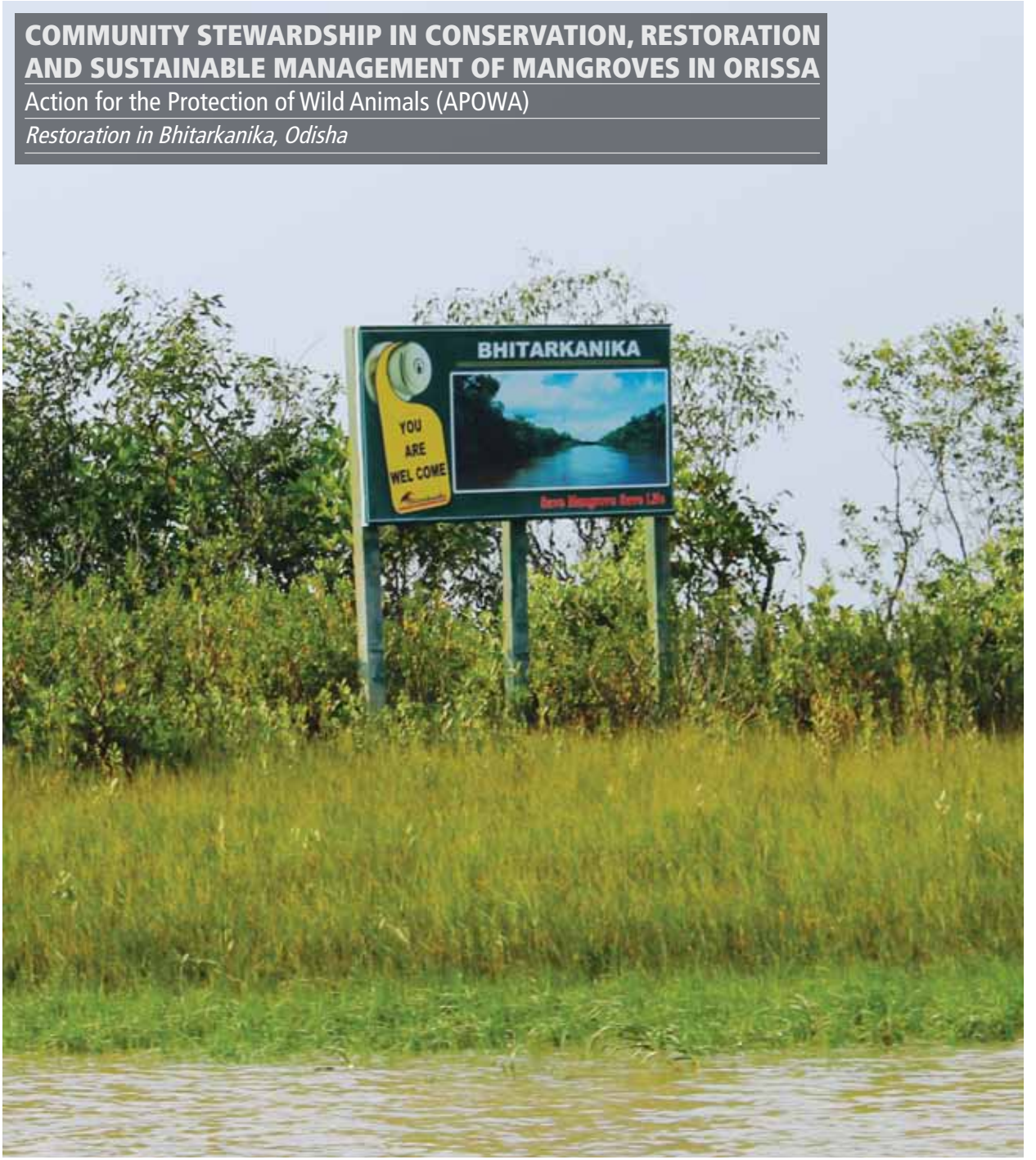

National Env. Policy
Biodiversity Action Plan
State Policies for Biodiversity
WB, AP, TN, GUJ, OR
NCB
Chair: MoEF&CC, A/S
Integrated Coastal Zone Management
WB, AP, TN, GUJ, OR
CiTES
TRAFFIC
Ramsar Guidelines
CBD and Aichi Targets
MFF NATIONAL STRATEGY & ACTION PLAN
MFF INDIA
IUCN - INDIA
IUCN - SRI LANKA
2008
Phase 1
Small Grants
9 Projects
2011
Phase 2
Small Grants
7 Projects
Large Grant
1 Project
Regional
1 Project
CAPACITY BUILDING
MFF Programme
Policy Inputs
Programme Feedback
AP Andhra Pradesh
GUJ Gujarat
OR Odisha
TN Tamil Nadu
WB West Bengal

SMALL GRANT 01

COMMUNITY STEWARDSHIP IN CONSERVATION, RESTORATION AND SUSTAINABLE MANAGEMENT OF MANGROVES IN ORISSA

Action for the Protection of Wild Animals (APOWA)

Restoration in Bhitarkanika, Odisha



APOWA

Mangroves have long been seen as the iconic symbol of coastal ecosystems and an intricate web of plant life, central to coastal protection and biodiversity. Mangrove destruction is on the rise worldwide. The impacts of widespread urbanisation and industrialisation go far beyond the immediate site of action. Upstream effluence and sewage discharge reach marine outlets, destabalising the delicate balance that ecosystems need for survival. Many coastal communities are forced to cut down the forests for domestic energy needs.

The coastal communities around the Bhitarkanika mangrove forest in Odisha are no exception. Two hundred thousand people live in and around the forest. They rely on agricultural livelihoods and non-timber forest produce for firewood. In addition, construction of marine infrastructure development such as the nearby port, deforestation and overgrazing have further destroyed the forest.

APOWA's project focused on developing community led sustainable management and conservation strategies for the mangrove forests. For communities that live on the edge of sea and land, the forest is an immense source of protection. The continued but sustainable use of the forest supplements their livelihoods. Mangrove nurseries were also included as part of the project to provide training for community members and contribute towards rehabilitating degraded forests. In addition to the specific project objectives of sustainable community stewardship of the mangrove forest, APOWA developed strong alternative livelihood recommendations. This was demonstrated in 10 villages in Rajnagar Block.

Community mobilisation is a slow process; to achieve project results through collective action of different groups necessitates trust. A series of trust building steps were put in place to allow community members to see the value of engaging with mangrove restoration and long-term conservation, as well as investing in supplementary livelihoods. The APOWA project actively encouraged village communities to put aside their differences through frequent dialogue and shared activity. Without steps like these, the continuity of the project would have been compromised.

OUTPUTS

- 14,800 mangrove propagules were planted in 5 hectares of land in Basantpur village.
- 21,300 mangrove saplings were planted in 7 hectares of land in Khirkot village.
- Outreach activities were undertaken involving 1,100 community members and eco-clubs for 1,178 school students. Eco-clubs provided education on the relationships between land and sea, and role of protection and conservation.
- 560 man-days of additional income provided by rural infrastructure projects required for nursery as part of Mahamta Gandhi National Rural Employment Guarantee Scheme (MNREGS).
- Capacity building workshops were provided for women's self-help groups to take on responsibility for mangrove plantation, protection and motivation for wider circles of volunteers.
- Dependency on forest for grazing, domestic firewood, and fodder noticeably declined.
- 10 village Mangrove Committees created, recognised by Gram Panchayats, to act as stewards for forest protection.

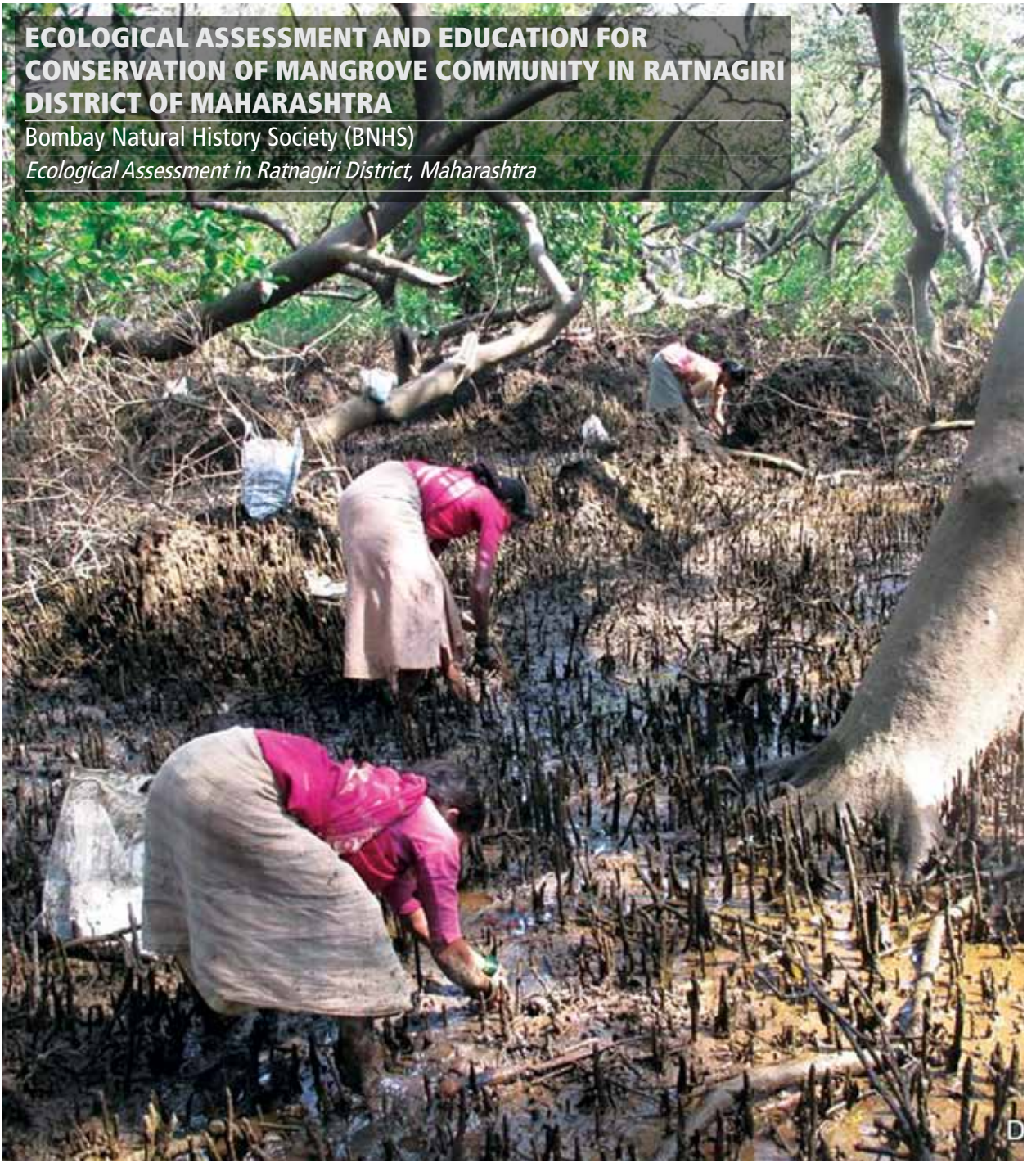
Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	Y
Livelihoods	Y
Socio-Ecological Resilience	Y

SMALL GRANT 02

ECOLOGICAL ASSESSMENT AND EDUCATION FOR CONSERVATION OF MANGROVE COMMUNITY IN RATNAGIRI DISTRICT OF MAHARASHTRA

Bombay Natural History Society (BNHS)

Ecological Assessment in Ratnagiri District, Maharashtra



Swapna Prabhu, BNHS

Forty percent of the mangrove destruction in Maharashtra has been due to human interference. The ability of mangroves to adapt to high water salinity stress, allow water uptake, and prevent coastal erosion does not belie their extreme sensitivity to fluctuations in their natural habitat. The Konkan belt of the Western Ghats runs for 720 km and covers 6 districts. The majority of this area is agricultural land, with small amounts of mining and built-up area. However, this area is also facing grave impact of stresses such as industrialisation.

The study by BNHS, aimed at documenting the status and threats to the Mangrove forests in the selected area of Ratnagiri District of Maharashtra, also took the steps to develop preliminary education and capacity building for the dependent communities on the protection and conservation of mangroves.

A literature review was undertaken to confirm the importance and existence of mangrove vegetation on the Konkan coast since the early 1900s. National surveys reflected the high level of avian diversity in the mangrove areas and BNHS concluded that this Important Bird Area (IBA) played a critical role in the food chain of the coastal ecosystem.

Mangroves are not homogenous and vary according to environmental factors and geography. BNHS used GPS mapping to identify mangrove sites – species richness, diversity, short and long-term vegetation. The analysis revealed 18 true mangrove species with one variety and 15 frequent associates. The family *Rhizophoraceae* dominates with 7 species, and *Sonneratiaceae* and *Avicenniaceae* each have 3 species. *Euphorbiaceae*, *Meliaceae* and *Fabaceae* are single genus species that are present. The floral ecology of the mangrove forests of Ratnagiri has never before been documented. With this project, BNHS adds intelligence to the database of knowledge around mangrove hotspots.

Alongside documentation, BNHS worked to take the information to the dependent communities, through community outreach and capacity building. A demonstration site was developed with community participation, for greater understanding of mangrove proection. Awareness programmes were developed and they focused on the importance of mangroves for ecosystem balance.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	N
Livelihoods	N
Socio-Ecological Resilience	Y

OUTPUTS

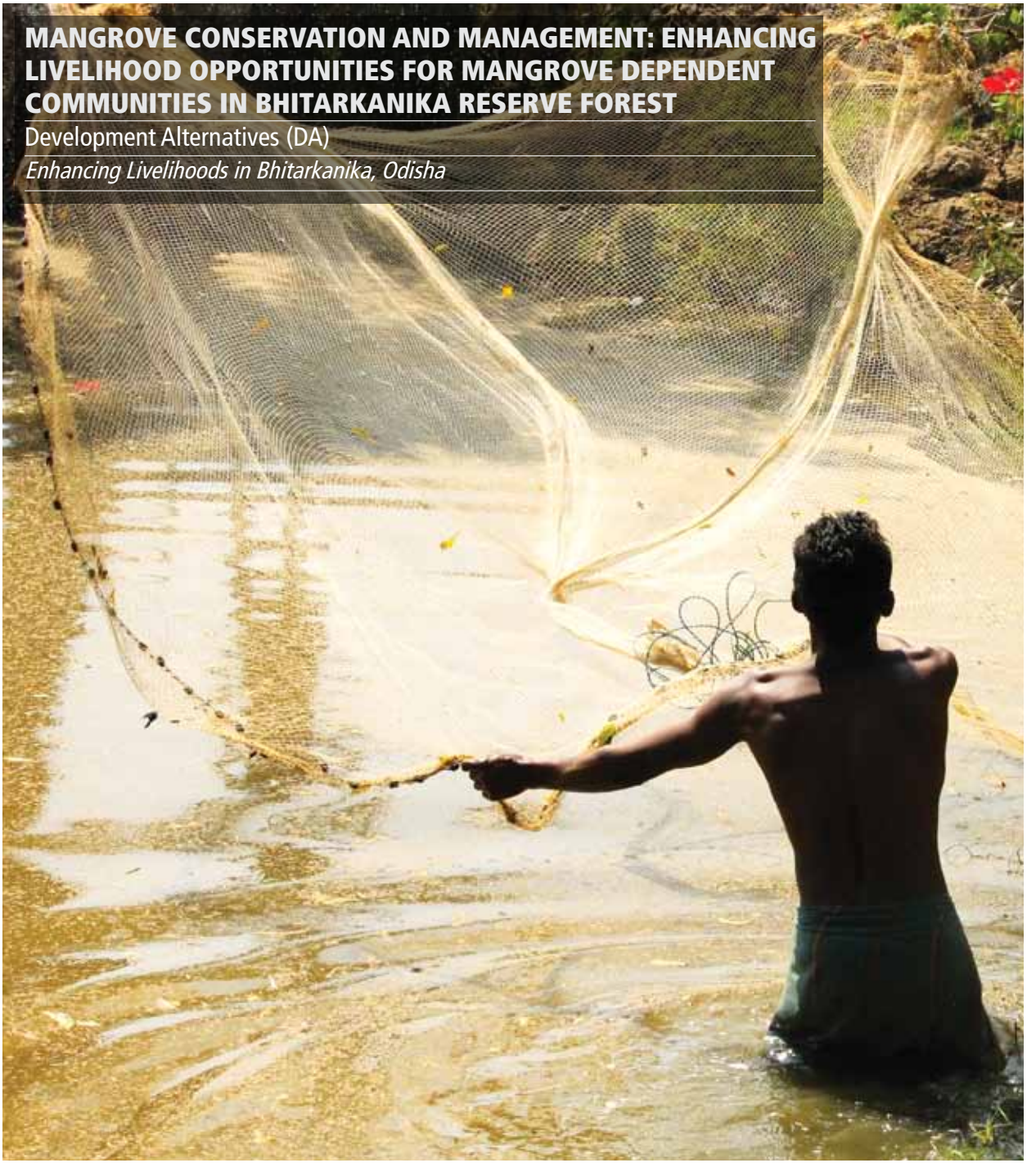
- Unique data was obtained on mangrove forest characteristics in Ratnagiri. There were 18 true mangrove species documented and 15 frequent associates.
- Awareness camps were held for 6 villages.
- Awareness camps were held in 17 schools.
- 10,000 saplings were raised in demonstration nursery.
- Mangrove nursery work was led by women self-help groups.

SMALL GRANT 03

MANGROVE CONSERVATION AND MANAGEMENT: ENHANCING LIVELIHOOD OPPORTUNITIES FOR MANGROVE DEPENDENT COMMUNITIES IN BHITARKANIKA RESERVE FOREST

Development Alternatives (DA)

Enhancing Livelihoods in Bhitarkanika, Odisha



Nisha D'Souza, ICUN

In Bhitarkanika Wildlife Sanctuary in Odisha, overgrazing, overfishing, pollution and sewage discharge have all negatively impacted the mangrove. The communities living within the forest are highly reliant on natural resources for their livelihood and as a result, on the mangrove forest. Both the forest and the communities that rely on them are seen to be vulnerable to the changes occurring in the immediate environment. Steering the communities to supplementary livelihoods would serve a mutually beneficial purpose, strengthening their position for the future, and serving to protect the mangrove forest.

The purpose of the Development Alternatives (DA) project was to build awareness of the value of mangroves with the forest communities, map out current livelihood patterns and develop possible supplementary livelihoods to reduce pressure on the forest. Additionally, the project aimed to assess and monitor the mangrove forest through land-use and land cover mapping, using satellite remote sensing and GIS technology.

A baseline assessment was undertaken to understand the socio-economic realities of the communities living alongside the forest and reliant on it for their livelihoods in Chainrakolha and Garta villages of the Wildlife Sanctuary. Ninety-eight percent of the forest community are Other Backward Class (OBC) with an average annual income of INR 39,000 and are largely in debt. In order to understand how to aid in the transition away from mangrove dependence, intelligence was gathered on the potential suitability of public schemes that could be called upon for direct employment, such as MNREGS and the Targeted Rural Initiative for Poverty Termination and Infrastructure.

In order to gather the required information and share outcomes and recommendations with the community, trust building with the community was an important facilitating factor. DA undertook the capacity building process through *nukkad natak* or street theatre, done by local partners for relevance and context. These performances demonstrated how lives were made better and more secure by healthy forests.

DA developed a supplementary livelihoods booklet based on the results of field investigations. A community vote selected the development of puffed rice and fish farming as strong possibilities of supplementary livelihoods. Given this consensus, DA supported capacity building sessions for local communities on developing puffed rice and fish farming. Mahila or women's groups facilitated sales. Both these alternative livelihoods strengthened the communities' economic resilience and reduced their dependency on the mangrove forest. DA was able to confirm the reduction of mangrove destruction through their land use and land cover studies undertaken with GPS and satellite data.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	N
Livelihoods	Y
Socio-Ecological Resilience	Y

OUTPUTS

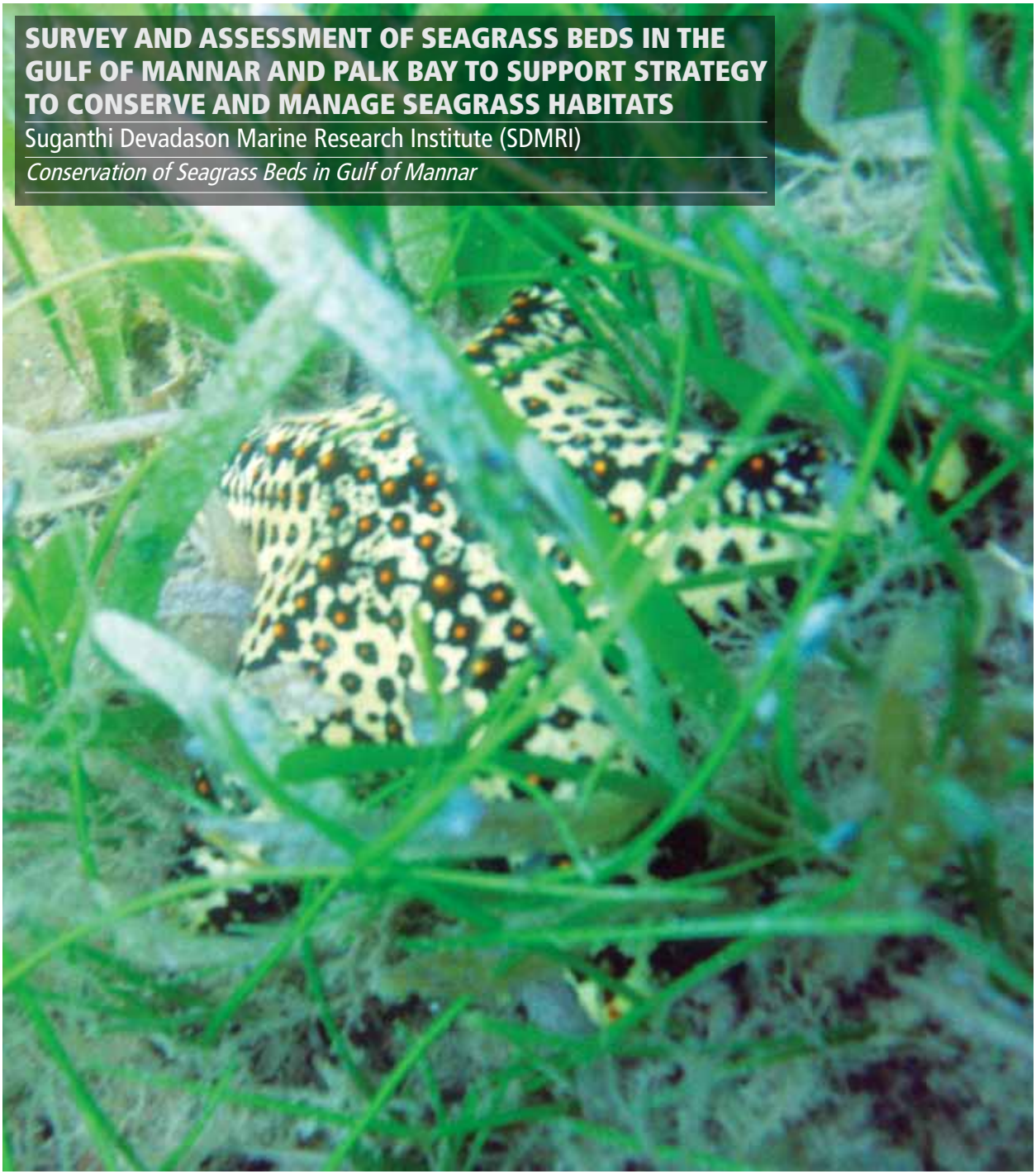
- 130 women were engaged in developing puffed rice as an alternative livelihood.
- Rice was bought at INR 30 and sold at INR 35. This has a profit potential of INR 30,000 annually.
- Demonstrations of integrated fish farming was done with an investment cost of INR 60,000 and a yield of INR 144,000.
- Traditional farming provided 500 kg of fish per acre. The new process provides 3000 kg of fish per acre.

SMALL GRANT 04

SURVEY AND ASSESSMENT OF SEAGRASS BEDS IN THE GULF OF MANNAR AND PALK BAY TO SUPPORT STRATEGY TO CONSERVE AND MANAGE SEAGRASS HABITATS

Suganthi Devadason Marine Research Institute (SDMRI)

Conservation of Seagrass Beds in Gulf of Mannar



SDMRI

Seagrasses are submerged plants, and the only flowering plants that can live underwater. They are found in shallow marine waters and provide shelter for marine organisms. Their extensive root structures are current breakers for wave action created during storms. Seagrasses are the main diet for Dugongs and sea turtles. Although they are critical to maintain marine life balance and act as an important first line of protection against storm surges, they are one of the least understood marine ecosystems in India.

Major seagrass beds are distributed along the southeast coast of India, in the Gulf of Mannar and Palk Bay. The 21 islands from Rameswaram to Kanyakumari that make up the Gulf of Mannar were declared a Marine Biosphere Reserve in 1989, under the Man and Biosphere Programme of UNESCO. Similarly, Dugongs are protected under the 1972 Wildlife Protection Act in India.

Although much literature exists on the patterns of seagrass growth in the Gulf of Mannar, not as much is known and documented for the Palk Bay region, despite it having a significant quantity and quality of seagrass beds. The purpose of SDMRI's project was to understand the current status of seagrass beds in selected areas in the Gulf of Mannar and Palk Bay. This would be done through literature review, but also through field investigation and groundtruthing with local fisherfolk and experts. SDMRI additionally looked for information regarding Dugongs and their presence in the areas. Given the symbiotic relationship between Dugongs and the seagrass beds, the two sets of data support and strengthen one another, especially when developing both short and long term management plans. The Dugong study was conducted in response to a direct request from the MoEF&CC to fulfil the country's Conservation of Migratory Species (CMS) obligations. The reduced number of Dugong in the area is attributed to trawling and the use of gill nets.

Despite the relatively short duration of the project, SDMRI was able to develop informed conclusions about the need for seagrass development in the areas of the Gulf of Mannar and Palk Bay. It was concluded that there was species variation between the two areas, despite their close proximity. This was attributed to a number of reasons, including exposure to the open sea and the position in relation to strong waves and currents. The study recommended that a specific management plan needs to be put in place for each of these areas, based on the nature of flora growth.

OUPUTS

- In both areas, the species *cymodocea serrulata* had the most dominant coverage and had the highest shoot density and above-ground biomass. In the Gulf of Mannar, this was supplemented with an additional 7 species and an additional 5 species in Palk Bay.
- 20% of seagrass beds in Palk Bay were confirmed to be degraded. Rehabiltation of seagrass beds as short-term action was advised, along with the development of seagrass rehabilitation and plantation protocols.
- Observations and documentation reflect differet species in each area. Management plans will differ, factoring in species diversity.
- SDMRI held stakeholder workshops in 4 villages, and transferred knowledge about documenting Dugong presence.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	Y
Livelihoods	N
Socio-Ecological Resilience	Y

SMALL GRANT 05

CONSERVATION AND WISE USE OF VEMBANAD-KOL: AN INTEGRATED MANAGEMENT PLANNING FRAMEWORK

Wetlands International – South Asia

Integrated Management, Vembanad-Kol, Kerala

Nisha D'Souza, IUCN

Wetlands form part of the extensive backwaters that are associated with Kerala's iconic landscape. The wetlands boast of extreme ecological diversity with an estimated 147 species of plankton, 338 plants, 158 fish and 225 bird species. In 2002, the Vembanad-Kol wetlands were distinguished as wetlands of international importance and brought under the Ramsar Convention. However, economic activity of the early 2000s, including the construction of large-scale ports, increase in tourism and the diversification of livelihoods in and around the wetlands, have negatively impacted their health and future sustainability. The size of the wetlands has reduced significantly between 1834 and 2010, from 365 sq. km to 179.25 sq km. Tourists come to see the backwaters of Kerala every year and employ up to 820 boats. In order to facilitate this movement, extensive swathes of mangrove forest were culled. Historically, the area had widespread mangrove growth, and it was noted that there were 6 true mangrove species and 17 species of mangrove associates. Mangroves are now limited to Kumarakom and Mangalavanam in the backwaters.

This project was undertaken in response to a request from the State Technical Wetland Unit of Kerala State Council for Science, Technology and Environment, for a management planning framework for the Vembanad-Kol backwaters of Kerala. In order to do this, an evaluation and description of wetland features were outlined. Following this, the ecological character was elaborated, including its status, trends, threats and the monitoring framework that could be considered for management. Finally, the institutional requirements and management plan were finalised after understanding the policy framework and socio-economic priorities of the stakeholders involved with Vembanad-Kol.

The methodology followed the Ramsar guidelines, a set of principles for the sustainability of internationally important wetlands, outlined at the 1971 Ramsar Convention in Iran. Conservation was the objective of the management practice programmes. To achieve this, transparent and open negotiations that focus on equitable socio-economic outcomes were necessary. Using an integrated water resource management perspective, Wetlands International - South Asia (WISA) brought together the concerns of boat managers, fisherfolk, artisans, industry and residential households.

OUTPUTS

- A framework developed for the management of Vembanad-Kol recommend the establishment of the Kerala Wetland Management Authority to ensure the effective management of multi-stakeholder engagement.
- The framework outlined the activities to be undertaken to ensure biodiversity conservation, hydrological connectivity and balance, and protect community livelihoods through the development of eco-tourism models, sustainable agriculture and fisheries.
- An integrated Wetland Inventory Assessment and Monitoring System has been recommended to provide support for a robust system of management, including a budget and time-based activities for a period of five years.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	Y
Livelihoods	Y
Socio-Ecological Resilience	Y

SMALL GRANT 06

AN ASSESSMENT OF THE PAST AND PRESENT DISTRIBUTION STATUS OF THE WHALE SHARK (RHINCODONTYPUS) ALONG THE WEST COAST OF INDIA

Wildlife Trust of India (WTI)

Study of Whale Shark Population, West Coast, India

CREDIT

Whale sharks are the largest known fish species. They are also victims of unconscious bycatch or accidental capture. Whale sharks exist in tropical and warm temperate seas. They have been of limited commercial value to fisherfolk until relatively recently, when interest in their flesh, fins and oil increased within South and Southeast Asia. India banned the capture of whale sharks in 2001 under the 1972 Wildlife Protection Act.

In 1999, 465,000 kg of whale shark meat were recorded as sold from Veraval in Gujarat, valued at approximately INR 218,000. In 2001, with the admittance of whale sharks into the 1972 Wildlife Protection Act, this trade was brought to an end, and the largest incidence of death was limited to bycatch and surface collisions.

The purpose of the project was to create a campaign to protect the whale shark by increasing fisherfolk awareness of their protected status. The project objectives were to understand the distribution of whale sharks across the West Coast of India, the threats they face, and identify whale shark congregation hotspots. These first steps provide recommendations for a recovery plan that can be developed in line with the contextual needs of each area.

The study was undertaken in two parts; the first being strong secondary data collection and literature surveys to understand the current distribution of whale sharks along the west coast. The Central Marine Fisheries Research Institute (CMFRI), whose operational area overlapped with that of the study, was a strong supporting partner in this regard. The second part was providing recommendations for recovery plans.

The study utilised two specific knowledge frameworks; Indigenous Technical Knowledge (ITK) and Traditional Ecological Knowledge (TEK). Along the west coast, 118 fishing villages along 1,846 km of coastline in Goa, Karnataka, Kerala, Lakshwadeep and Maharastra were selected for the study. During the fishing holidays, 1,703 fisherfolk were questioned.

OUTPUTS

- Incidental catch is a result of the kind of net being used. The highest percentage of incidental catch occurred with the gill net. Maharashtra had the highest level of whale shark bycatch with 29 percent of the total, and Goa had the lowest, at 17 percent.
- For all site areas selected except Lakshwadeep, whale sharks prefer winter months for movement. In Lakshwadeep, movement is year long and on average, fisherfolk have sighted up to 20 whale sharks in their lifetime.
- The study identified four aggregation zones: Minicoy and Kavaratti in the Lakshadweep Islands, the Malvan Coast, Netrani Island, and the Saurashtra coast.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	Y
Livelihoods	Y
Socio-Ecological Resilience	Y

SMALL GRANT 07

COMMERCIALLY IMPORTANT GASTROPOD SHELL RESOURCES AND TRADE IN INDIA: DISTRIBUTION, STATUS AND CONSERVATION STRATEGIES

WWF - India

Sustainable Trade of Gastropod Shell, Coastal Tamil Nadu and Kerala

Nisha D'Souza, IUCN

Molluscs, the majority of which are found in backwaters, are sought after for food, as well as ornaments and jewellery. Of the 3271 species of molluscs reported along the Indian coast, 1900 are gastropods. Gastropods were historically used as currency, and are still enjoyed for their aesthetic beauty. Accidental capture or bycatch has endangered gastropods, resulting in their protected status (under the Wildlife Protection Act, 1972). At the same time, ornaments and handicrafts made out of gastropod shells are becoming highly valued in Indian and international markets. Reconciling the tension between commercial gain and conservation is at the heart of this project.

The project objective developed by WWF is to provide information on the availabilty and stock status of ornamental gastropods along the Tamil Nadu and Kerala coast. The project was aimed at analysing the distribution patterns as well as the commercial value of the gastrpods. This intelligence will feed into an effective conservation strategy for gastropods in the area.

The project area was along the Tamil Nadu and Kerala coastline. Seven study stations were included; two in Kollam district in Kerala and five in the Gulf of Mannar in Tamil Nadu. The project elaborated on collections of gastropods: areas of highest collection and the nature of collection with regard to boat type and nets.

WWF documented the value chain of gastropod collection and sales. This has been done from the point of collection with fishermen to the final points of sale in Kerala and Tamil Nadu. The study showed that the price paid at collection was 50-100 times lower than the final price at the end of the value chain.

The project developed a policy brief and field guide with the information on trade. Recommendation to protect further incidental bycatch of gastropods and illegal sales is being developed. This information will be passed on to the Gulf of Mannar Biosphere Reserve Trust and TRAFFIC India for stronger and informed law enforcement.

OUPUTS

- Shells of the species *Conus Oliva* have excellent demand in the international market
- One of the major threats is tourism related activities on the beach affecting the breeding ground of gastropods.
- The retail industry employs around 3000 people in Rameswaram alone, with shells sold at INR 3-5 per shell at source. After processing, prices go up 4-6 times.
- Trade is done by a number of agents, including SHGs, and provides a strong livelihood support for women.
- Project recommends stakeholder consultation and awareness on the sustainability of resources and management interventions for the conservation of resources. Further investigation of trade in other areas of India with mollusc diversity is recommended.

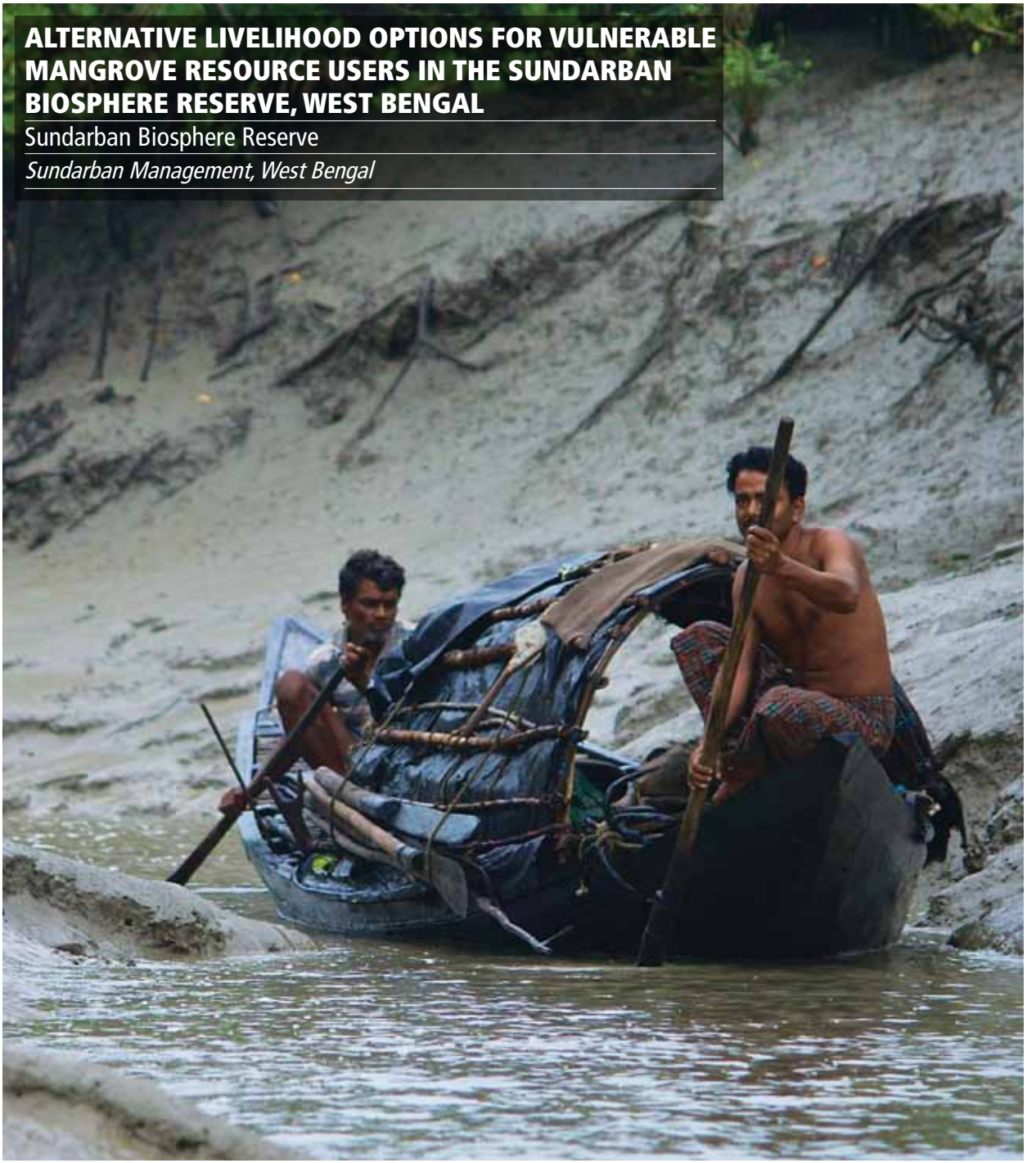
Co-Financing	N
Sustainable	Y
Replicable	Y
Policy Advocacy	N
Livelihoods	Y
Socio-Ecological Resilience	Y

LARGE GRANT

ALTERNATIVE LIVELIHOOD OPTIONS FOR VULNERABLE MANGROVE RESOURCE USERS IN THE SUNDARBAN BIOSPHERE RESERVE, WEST BENGAL

Sundarban Biosphere Reserve

Sundarban Management, West Bengal



Nisha D'Souza, IUCN

MFF Large Grant Projects were largely developed in order to allow direct policy implementation. IUCN India signed its first large grant project in 2011 with the Alternative Livelihood Project in the Sundarban Biosphere Reserve, the world's largest tiger-mangrove habitat. Extreme weather events have impacted the livelihoods of coastal communities in the Sunderbans. Increased salinity and erosion have reduced agricultural outputs and resulted in increased human-wildlife conflict, as both go inland for sustenance. The Sundarbans Large Grant project derives its base from the initial learnings developed through the MFF Phase I Small Grant Project *Critical Evaluation of the Impacts of Alternative Livelihood Programmes in Reducing Dependence on the Sundarbans Mangroves.* The project focused on deeper understanding of existing conditions and options of alternative livelihood activities for the target communities. The project's livelihood interventions operated in the Matla and Raidighi ranges, located in South 24 Parganas, within the Sundarban Biosphere Reserve. Additionally, these areas were selected for the high incidence of human-wildlife conflict, where alternative livelihood development was seen to be most needed.

The Indian Sundarbans was designated a Biosphere Reserve in 1989. The Sundarban Biosphere Reserve is headed by the Director, Sundarban Biosphere Reserves in the rank of Chief Conservator of Forests, Government of West Bengal. The Sundarbans is home to more than 4.2 million people[4], with a population density of 800 people per square kilometre. It is also the world's largest mangrove habitat, with over 98,000 square kilometres of fragile ecosystem spanning the coast of India and Bangladesh[5]. The 2009 cyclone Aila pushed an already fragile ecosystem onto the verge of collapse. Although there was a relatively low number of fatalities, there was widespread infrastructural destruction. Ninety percent of houses in the area were damaged and families with hardly any savings were forced to either spend borrowed money to rebuild or camp out along the embankments. High salinity levels affected agricultural lands, reducing the ability to grow crops. With reduced harvests, farmers were unable to live off the land. Farmers and their families were forced to migrate to look for contract work in nearby cities and towns. Additionally, families turned increasingly to the mangrove forests as a means to help provide them with livelihood options. The MFF Large Grant project focused on providing sustainable livelihoods that would reduce the pressure on the mangrove ecosystem as well as provide economic improvement for some of the world's most vulnerable coastal communities.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	Y
Livelihoods	Y
Socio-Ecological Resilience	Y

The Sundarban Biosphere Reserve, along with project partners World Wildlife Federation (WWF), Nature Environment & Wildlife Society (NEWS), Indian Institute of Management, Kolkata (IIM), Bali Nature Club and Southern Health Improvement Samiti (SHIS), worked to develop strong relationships with the project communities, including Eco-Development Committees and Forest Protection Committees in the project area. Investigative studies and medical camps were conducted to contribute towards trust building and sustainable management among all stakeholders. The West Bengal Forest Department will use the results of the project to develop livelihood and skill training

for the communities for stronger sustainable ecosystem management.

OUPUTS

Skill Training of SHGs in Alternative Livelihood Development

- Forest Department together with the Joint Forest Management Committee members organized SHGs working with women from the poorest sectors in each village, most likely to engage in illegal natural resource exploitation activity

Benchmark Report of mangrove species with regard to salinity, physico-chemical and anthropogenic suitability in different environmental conditions

- Report identified 19 mangrove species in 24 Parganas and Sunderban Tiger Reserve; 33 mangrove species documented in Sunderban Biosphere Reserve; Links made between soil and water salinity, pH and mangrove growth.
- The report will be used as a management reference tool while listing the livelihood options under various entry point activities. This will help in preparation of micro-plans for the 65 JFMCs. The report will be used by the Forest Department for sustainable species selection on mangrove restoration.

Report on alternatives for existing livelihood options, and developing preparedness plans

- Activities to develop report were undertaken with four JFMCs, PRAs, DPP plans. Vulnerability assessments undertaken to aid in understanding of alternative livelihood potential. Institutional mechanisms put in place to link up teams to Government relief system.
- The report will be used to develop 'climate adaptive measures' which can contribute towards the resilience of mangrove user groups.

Nisha D'Souza, IUCN

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Feasibility Study on Microfinance Initiatives

- Activities undertaken to understand the barriers and opportunities for MFIs to operate in selected areas.
- The report identifies the opportunities that Micro Finance Institutions development will provide for community members who are unable to take up alternative livelihood activities due to lack of finance. Report lists criteria for feasibility of micro-finance initiatives in a number of villages.

Strengthened Institutional Capacity of Stakeholders for Mangrove Conservation Management

- The report looks to understand the effectiveness of JFMCs. Activities included assessment of JFMC and community participation in plan development, financial management and responsiveness.
- JFMCs were originally established with the idea of strong community based resource management. The programme Report will be used to develop the JFMCs into strong and meaningful institutions.

Trust Building Through Medical Camps

- Members from SHIS worked closely with the local panchayat, mahila samiti and local clubs to spread awareness, and offer facilities such as medical practitioners at these camps. Medical camps were conducted for local communities.

Joint Forest Management Capacity Building

- Create awareness amongst JFMC members in project areas about conservation of Sundarban mangroves and tigers.

REGIONAL GRANT

GULF OF MANNAR: REGIONAL PROGRAMME

IUCN SRI LANKA, IUCN INDIA

Coastal Management Plans: Gulf of Mannar

Nisha D'Souza, IUCN

The Gulf of Mannar (GoM) shares coastal borders with both India and Sri Lanka. GoM is a biodiversity hotspot and home to millions who rely on it for their livelihoods. Threats to marine and coastal biodiversity have been identified, including pollution, potential bio-invasion, unplanned coastal development and illegal activities such as coral mining, dynamite fishing, dredging and the exploitation of biological resources. Despite its richness, there is relatively little documentation of the region that is of use to policy makers. As a result, a project between IUCN Sri Lanka and IUCN India was set up in 2011 to develop a knowledge base of the living resources in GoM. This programme addressed the sustainable use of living resources and the threats being faced in the region. ~~All stakeholders in the project were coordinated through the participation of the Bay of Bengal Programme (BOBP - IGO).~~ The BOBP-IGO is an intergovernmental organisation that was key to bringing a consolidated space for analysis and facilitation between all parties.

One of the main challenges identified by the programme is that information in many key areas is scarce and awareness is minimal. There are inadequate policies in place to address the various threats to the GoM. The need to create and implement sufficient laws, policies and conservation activities is paramount. The regional programme has concluded that adequate information needs to be collated on species and ecosystems, threats, current awareness levels and conservation needs. With this information in place, legal and policy frameworks will be strengthened and successful conservation activities will be put in place. In turn, this will enhance ecosystem services and directly benefit local communities. The first step undertaken was to conduct baseline surveys of the current status of coral reefs, Dugongs, Cetaceans, and seagrass beds.

Co-Financing	Y
Sustainable	Y
Replicable	Y
Policy Advocacy	Y
Livelihoods	Y
Socio-Ecological Resilience	Y

OUPUTS

Coral Reefs

- Reefs around the island of Tuticorin, of the 21 islands in the GoM, are severly degraded as a result of mining activities. The Vembar group of islands are covered with mostly dead coral boulders.
- Overall live coral cover has increased in GoM due to the reduction of mining activity.
- Warming and acidification of seawater threaten the survival of the reefs beyond the year 2040.
- Limited information exists about population density of corals and reef associated species. This

is needed for sustainable biodiversity management. More information is also needed on the relationship between economy and coral reef ecology.

Dugongs and Cetaceans

- GoM is historically an area with an abundance of Dugongs and Cetaceans, but they are now nearing extinction because of loss of seagrass beds, an important food source and habitat.
- Hunting continues to be a problem despite bans. Fishing vessels and nets are also causes of death.
- There is limited information or awareness of marine mammals in the area. Outreach and capacity building for fishermen in the area could reduce loss.
- Recommendation to constitute Transboundary Task Force for monitoring and capacity building.

Seagrass Beds

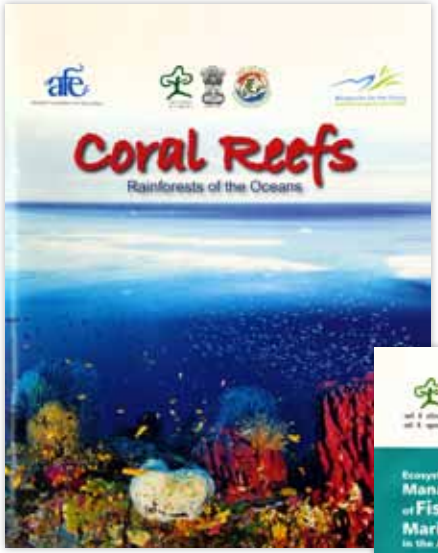
- Mapping of seagrass beds has been limited.
- There is reduction of seagrass beds due to ineffective resource utilisation, increase in international trade and inadequate legislation.
- More information is needed to understand the role of seagrass beds in carbon sequestration.
- It has been recommended that seagrass beds be included as a major component to National Coastal Zone Management Plan.

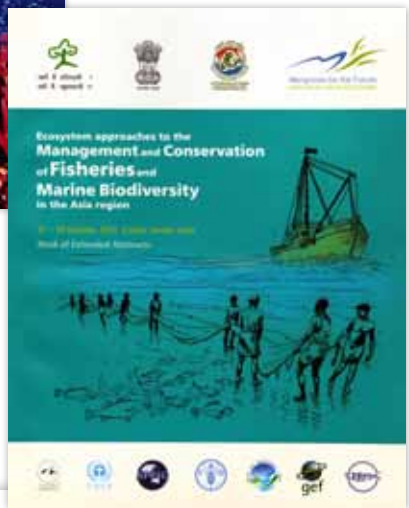
With final policy analysis underway, the project will facilitate a platform for larger seascape understanding, and contribute towards a strong, viable knowledge base on coastal and marine biodiversity. These activities enable policy changes and are vital to successful implementation of even larger trans-boundary regional seascape conservation programmes.

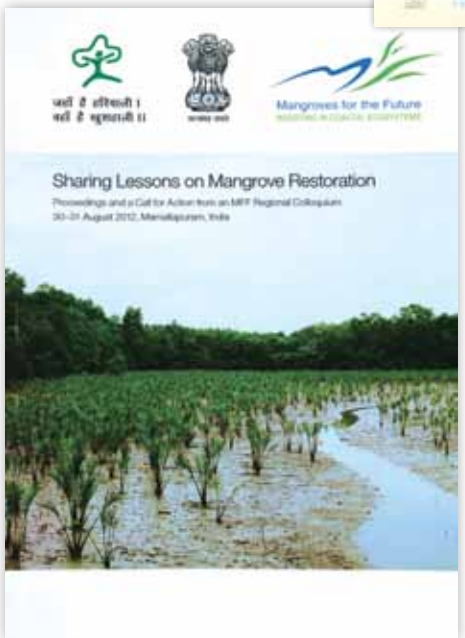
Nisha D'Souza, IUCN

Bridging the Gap

In addition to steering the National Programme, with its partner organisations, the MFF (India) Secretariat undertakes outreach initiatives with an aim to fill the capacity and knowledge gap at national, state and local levels around coastal conservation and restoration. Specific target groups for these products are public officials, academics, children and all stakeholders working with and on coastal habitats.





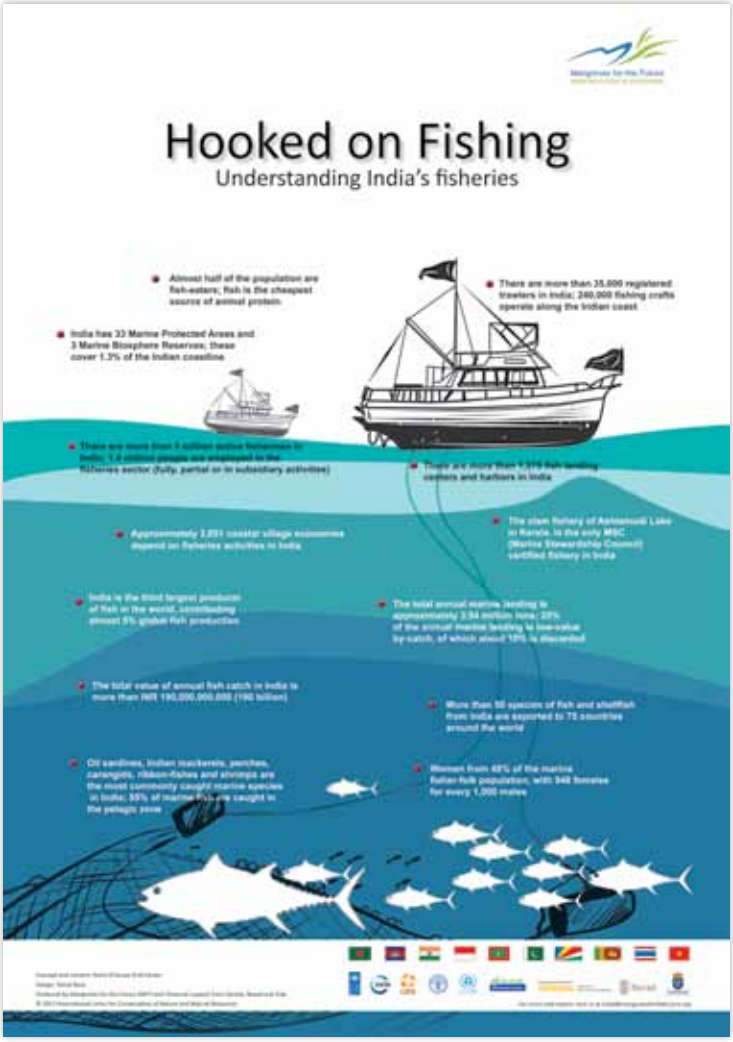


Publications

'Coral Reefs, Rainforests of the Ocean', an illustrated publication of the diversity and challenges to the world's coral reefs, is the second in MFF's series of young adult outreach. It describes the importance of coral reefs in the context of coastal ecosystems, outlines the challenges faced and the actions that are and can be taken to win the battle of conservation.

'Sharing Lessons on Mangrove Restoration: Proceedings and a Call for Action from an MFF Regional Colloquium', puts together the papers that were part of the MFF Regional Symposium on mangroves. The 24 papers were from across Asia, focusing on issues of economic valuation, rehabilitation, good practices and the impacts of climate change with relevance to the Aichi Targets on Biodiversity. The publication was launched at the Convention on Biological Diversity, Conference of Parties in Hyderabad in October 2012

'Ecosystem Approaches to the Management and Conservation of Fisheries and Marine Biodiversity in Asia Region' compiles the abstracts presented at MFF Symposium on Fisheries held in October 2013 in Cochin, Kerala. The Symposium highlighted the need for an integrated approach to coastal management, of which an ecosystem approach to fisheries was central.



Posters

'India's Coastal and Marine Treasure Chest' was directed at children to describe the diversity of India's oceans. The poster illustrates 21 of over 15,000 species that inhabit India's oceans and provides descriptions and locations of preferred habitats of these species.

'Hooked on Fishing' was developed for MFF's Symposium on Fisheries held in October 2013. The poster explains the various facts and figures of fishing activity undertaken in India.

"The National Coordination Body (NCB) has been at the centre of this journey. The Additional Secretary of the Ministry of Environment, Forests and Climate Change, Government of India is the Chairperson of NCB India, which also has representatives from the national government, private sector and civil society."

- XXX

Nisha D'Souza, IUCN

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MFF (India): The Way Ahead

The MFF Small Grants Programme was developed to respond to the urgent need for action following the 2004 Indian Ocean Tusnami. Phase I reconfirmed the value small steps can make in the larger context of the coast. Phase II focused on scientific evidence development, ground action and future policy discussions. Phase III, based on MFF's *Situational Analysis,* will take these findings into a larger process and focus on policy, coastal management and resilience. The programme today includes the Sundarbans Large Grant Project with the West Bengal Forest Department, as well as the Regional partnership project between Sri Lanka and India in the Gulf of Mannar. MFF India has also played host to two regional scientific symposiums that looked at (i) sharing lessons on mangrove restorations and (ii) a ecosystem approach to marine fisheries. Projects have not only responded to local need, but also contributed to National Biodiversity Targets.

MFF has created knowledge through its projects that focus on the importance of developing coastal resilience and partnership between stakeholders. MFF has used project funding to incubate new ideas that are based on science and community experiences. Together, these contribute to stronger policy formulations. The MFF Secretariat has worked with State agencies to develop capacity and outreach with coastal communities. Through its workshops and knowledge products, MFF has sought to create sustainable and informed change.

MFF's Resilience Approach will be at the centre of Phase III, which will develop an integrated perspective of interventions on coastal ecosystems. The approach of resilience, the core of MFF's work, will guide ongoing understanding of impact and actions across economic, cultural, social and environmental areas.

The National Coordination Body (NCB) has been at the centre of this journey. The Additional Secretary of the Ministry of Environment, Forests and Climate Change, Government of India is the Chairperson of NCB India, which also has representatives from the national government, inter-governmental organisations, private sector and civil society. This inherent multi-stakeholder platform has ensured that work undertaken has been in line with and contributed to state, national and international frameworks for managing coastal areas of national importance. The NCB has been at the core of pinpointing knowledge gaps and matching MFF's project potential to policy.

The NCB has brought together parties that might not have necessarily sat at the same table previously. Repeated cooperation and shared ownership amongst both individuals and organisations have resulted in a resilient, multi-faceted institution. Knowledge and science have been the key to all of MFF's projects, but it is with the oversight of the NCB that the results of these projects have been effectively leveraged. For this reason, as MFF moves from Phase to Phase and develops a broad base of partners, NCB remains a stable centre and reflection of commitment at the highest levels, from all sectors.

The challenges facing the seascape will continue. The realities of actions and impacts will continue to be felt beyond specific and isolated countries and regions. However, from small steps to institution building, MFF India has put into place a strong network of actors that will work to take forward coastal resilience.

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About this book

This publication shares the experiences and lessons learnt from MFF (India) small grant projects, and its own initiatives. It culls from various publications, national and international workshops on coastal and marine biodiversity, research and management, and other capacity building initiatives.

This book is an abridged narrative of the projects and the authors have heavily relied on the final technical reports of the implementing partners. The complete technical reports of these small grant projects can be found at the MFF India web site: **http://www.iucn.org/about/union/secretariat/offices/asia/asia_where_work/india_programme_office/india_programmes_and_initiatives/mff_india/**

The implementing partners of MFF (India):

Small Grant projects:

- Action for the Protection of Wild Animals
- Bombay Natural History Society
- Development Alternatives
- Suganthi Devadason Marine Research Centre (SDMRI)
- Wetlands International - South Asia
- Wildlife Trust of India
- World Wildlife Federation (WWF)

Large Grant project

- *Sundarban Biosphere Reserve with*
- Bali Nature Club
- Indian Institute of Management - Calcutta
- Nature Environment & Wildlife Society
- Southern Health Improvement Samity
- WWF

Regional Project

- *IUCN India and IUCN Sri Lanka with*
- Dr. Vivekanandan (lead consultant)
- CAS Annamalai University
- SDMRI
- M.S. Swaminathan Research Foundation
- MFRI

About MFF

Mangroves for the Future (MFF) is a partner-led initiative promoting investments in coastal ecosystems for sustainable development. MFF provides a collaborative platform for countries, sectors and organisations to address challenges to coastal ecosystem and livelihood issues, thus directing them towards a common goal.

MFF builds on a history of coastal management, before and after the 2004 Indian Ocean tsunami, particularly the need to continue the momentum and partnerships generated by the immediate post-tsunami response. Initially focusing on six countries worst-affected by the tsunami, India, Indonesia, Maldives, Seychelles, Sri Lanka, and Thailand, MFF has expanded to include Pakistan and Viet Nam. MFF will continue to reach out to countries in the region that face similar issues, with an overall aim to promote an integrated ocean-wide approach to coastal zone management.

MFF seeks to achieve demonstrable results in influencing regional cooperation, national programme support, private sector engagement and community action. This will be achieved through a strategy of generating knowledge and empowering institutions and individuals, to promote good governance in coastal ecosystem management.

Learn more at: www.mangrovesforthefurture.org

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