



# ***REHABILITATING COASTAL ECOSYSTEMS IN A POST-TSUNAMI CONTEXT: Consolidation Phase***

Final Technical Report  
January-December 2007



Ecosystems and Livelihoods Group

<b>Name of the project</b>	Rehabilitating coastal ecosystems in a post tsunami context: consolidation phase
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## **Acknowledgements**

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## **Background to the project**

After the tsunami 2004, review of the crippling damages caused by the tsunami showed that mangrove forests played a vital role in buffering the force of the waves and protecting human settlements. Many conservation organizations investigated the importance of mangroves in buffering the coastal communities and protecting resources in an extreme disaster and have published many scientific reports and papers. In addition, the value of mangrove goods and services has been estimated specially in these tsunami affected countries which highlighted that mangroves are key to local livelihoods as they provide breeding grounds for fish and other marine species, food, fodder, building material and natural medicines upon which local people depend. Mangroves also act as a natural water filtration system taking up excess nutrients, and have a carbon sequestration function that supports climate change mitigation.

As became all too clear in the aftermath of the tsunami, loss and degradation of these vital natural ecosystems and conversion of mangroves for alternative uses impacts heavily on coastal populations — in economic, livelihood and social terms, as well as through the loss of vital life support and protection services. It was clear that there was a need for immediate interventions for rehabilitation and restoration of tsunami affected coastal ecosystems parallel to the post-tsunami reconstruction. The main objective was to support the tsunami affected communities to maintain their living standard and improve their resilience. In addition, all the post tsunami rehabilitation and reconstruction activities have taken into account the environmental aspects and ensure that these actions are implemented in a participatory and scientifically sound manner.

As part of the international and national efforts IUCN established a tsunami response programme, aiming to provide a coordinated approach to technical assistance and targeted field activities oriented to ensuring that environmental considerations are a part of post-tsunami reconstruction efforts. This project, focusing on the restoration of mangrove ecosystems in and around tsunami-affected protected areas, was formulated as part of IUCN's post-tsunami response and the project responded to urgent needs to rehabilitate mangroves which were destroyed by the tsunami itself, to integrate natural ecosystems into the post-tsunami reconstruction process, and to reverse past damage and ensure that mangroves are re-established in areas where they have been cleared, as well as taking action to prevent their future loss and degradation.

In response to interest shown by the Organismo Autónomo Parques Nacionales (OAPN), Ministry of Environment of Spain in post-tsunami mangrove restoration, an initial project concept was prepared by IUCN in July 2005. The proposal built on on-going successful cooperation between IUCN-OAPN (including technical cooperation in the Mediterranean, implementation of the World Parks Congress, and work of the Iberoamerican Network on Protected Areas).

This project OAPN I was developed to address the long-term threats to mangroves in tsunami-affected countries, and to restore, rehabilitate and conserve these vital

ecosystems. Funding is being provided by the Organismo Autónomo Parques Nacionales (OAPN), Ministry of Environment of Spain, which has provided key support to IUCN's post-tsunami work from its early stages. Between September 2005 and December 2006, OAPN made available a grant to assist with mangrove rehabilitation in tsunami-affected areas of Sri Lanka and Thailand. OAPN has made available a second grant, running between January and December 2007, namely OAPN II to consolidate and share the lessons learned in the course of carrying out mangrove rehabilitation during the first phase of the project.

The project is now in the consolidation phase, which focuses on using the knowledge gained while carrying out the first phase for awareness raising and capacity building for those involved with mangrove restoration, particularly Protected Area managers. The consolidation phase aims to share information and learning with additional sites and groups in Sri Lanka and Thailand, the countries participating in the first phase of the project, as well as to extend learning to other tsunami-affected countries Indonesia and Maldives.

As an extension to the OAPN II *Rehabilitating coastal ecosystems in post tsunami context: Reinforcement and Extension Phase*, funding of € 110,000 has been provided by the Organismo Autónomo Parques Nacionales (OAPN), Ministry of Environment of Spain for one year start from 1<sup>st</sup> January to December 2008 . These funds will be allocated to strengthen further the ongoing activities under OAPN phase II and specially to extend this learning and support ecosystem restoration activities to additional sites in Maldives and Indonesia.

# Project Summary

## Project goals, objectives, outputs and activities

Goal		
To support ecosystem restoration and conservation in tsunami-affected coastal areas as a mechanism to strengthen sustainable coastal zone management policy and to reduce the vulnerability of coastal populations in tsunami-affected countries		
Objectives	Main Outputs	Activities
1 Document and share lessons and experiences on participatory approaches on post tsunami ecosystem restoration, post disaster reconstruction and sustainable coastal zone management.	1.1 Information and lessons learned on post tsunami ecosystem restoration produced and shared with coastal policy makers and planners	<ul style="list-style-type: none"> <li>Document best practices and methods for mangrove restoration in Indonesia, Sri Lanka and Thailand</li> <li>Review ecosystem aspects of post tsunami reconstruction in Sri Lanka and Thailand</li> <li>Establish and maintain web-based portal for disseminating and sharing of project information</li> </ul>
	1.2 Awareness materials on the links between mangrove restoration and livelihood security produced and shared at the local level	<ul style="list-style-type: none"> <li>Produce local language awareness materials on mangroves and livelihoods in Indonesia, Maldives and Sri Lanka</li> </ul>
	1.3 Multi-stakeholder regional dialogue for sharing of information, experiences and lessons learned on natural disasters, coastal ecosystems and Protected Areas held for Indian Ocean countries	<ul style="list-style-type: none"> <li>Hold regional dialogue</li> </ul>
2 Enhance the capacity of agencies involved in post tsunami reconstruction to incorporate participatory eco-restoration approaches in a post disaster context	2.1 Capacity built for post-disaster environmental assessment and management among conservation agencies	<ul style="list-style-type: none"> <li>Conduct field training courses in rapid environmental impact assessments and participatory eco restoration practices in Indonesia, Maldives and Sri Lanka</li> </ul>
	2.2 Field manual produced to guide Protected Areas managers and conservation practitioners in post-disaster coastal ecosystem assessment and restoration	<ul style="list-style-type: none"> <li>Produce and disseminate field manual on post-disaster coastal ecosystem assessment and restoration</li> </ul>

## Scope and focus

The goal of the consolidation phase is to provide “support to ecosystem restoration and conservation in tsunami affected coastal areas” as a mechanism to strengthen sustainable coastal zone management policy and to reduce the vulnerability of coastal population in Sri Lanka and Thailand. The objectives are to work with planners, policy makers and agencies involved in the post tsunami reconstruction process to: document and share experiences on participatory approaches on post tsunami ecosystem restoration; post disaster reconstruction and sustainable coastal resource management; and enhance the capacity of agencies involved in post tsunami reconstruction to incorporate participatory eco-restoration approaches in post disaster context.

The project has experienced an increase in scope, both geographically as well as technically. It was originally envisaged that the primary geographical focus of the project

would be Sri Lanka and Thailand (as determined during OAPN phase I). However, when it was felt that the project could magnify its outputs through involving sites in Indonesia and the Maldives, these countries have been added to the project. In addition to this, in response to direct requests from local partners and Protected Area authorities in Thailand for additional levels of capacity building and institutional strengthening, additional funds were requested from the donor to address these needs. Additional funds of euro 110, 000 have been received and will be used to further extend activities in Indonesia and Maldives in 2008.

With financial assistance from OAPN, IUCN Ecosystems and Livelihoods Group 2 (ELG 2), together with the IUCN Sri Lanka and Thailand Country Offices, has been working in the area of mangrove restoration since late 2005. During the current phase, it has extended the project activities to Indonesia, and plans to similarly carry out project activities in the Maldives during 2008. Further to assisting project stakeholders meet their needs of capacity building, the involvement of Indonesia in the project process will enhance knowledge development and sharing outputs under the project. Moreover, this move to involve Indonesia has resulted in the development of strategic partnerships and helped to increase the project's outreach to important stakeholders in Indonesia, such as Mangrove Action Project (MAP) and Australian Red Cross (ARC). For example, input from MAP has strengthened the capacity building components of the project and this alliance will benefit other planned and current coastal resources management projects (e.g. Mangroves for the Future Initiative).

## **Achievements and Results**

### ***Summary of key results achieved over 2007***

The project has successfully achieved its intended goal of supporting ecosystem conservation and restoration in tsunami affected coastal areas in Sri Lanka, Thailand and Indonesia, and generated the outputs specified in the agreement signed with OAPN. The key activities and outputs required to achieve the agreed goal and objectives for the grant, as elaborated in the project planning matrix, were implemented as planned..

The project has supported the production and dissemination of English language awareness materials on the role of intact and restored mangrove ecosystems in livelihood security in tsunami affected areas (in Sri Lanka and Indonesia). Under the project, field training has been given on post-disaster rapid assessments, environmental impact assessments during the post-disaster reconstruction phase, disaster risk reduction and participatory eco-restoration approaches, and a manual on these topics has been prepared. These activities were carried out by a multidisciplinary group of partners: IUCN Sri Lanka, CARE International Sri Lanka, Mangrove Action Project (MAP) Indonesia and Australian Red Cross (ARC) in Indonesia with the participation of local community members, working in partnership with the government PA authorities and other civil society organisations.

In addition to this, a review of the key actions of agencies involved in coastal ecosystem restoration and conservation in Sri Lanka and Thailand has been completed. The key outputs were: two banners, one poster, one synthesis report, two review reports on ecosystem aspects of post-tsunami reconstruction in Sri Lanka and Thailand, one policy paper, two documents on ecological mangrove restoration, one brochure, and one video

documentary. All these materials will be made available and disseminated to the public and other stakeholders in both countries by End February 2008.

More specifically, the project has achieved the following results (as documented in detail in the project quarterly reports already submitted):

- By the end of March 2007. A project planning matrix, work plan and milestones were developed with the participation of project partners in order to plan for the project activities and outputs, and reach a common understanding and interpretation of the project goal, objectives and activities. Awareness raising materials were developed for Sri Lanka and Thailand.
- By the end of June 2007. A project website was developed and hosted by the IUCN server, and case studies on lessons learned in Sri Lanka and Thailand have been produced.
- By the end of September 2007. All the other activities were implemented as planned except for the regional dialogue activity which has been postponed for 2008 for the following reasons after consulting OAPN.

The objective of this dialogue is to share the lesson learned during the different phases of the OAPN Project with a wider group of stakeholders. This would also provide other researchers with a platform to share valuable lessons learned during the post tsunami interventions. It was while planning for this Dialogue that the news regarding the additional funding support for the current Phase was received. As the funding was to be released around November-December, obviously the activities would be implemented in the following months. In light of these developments, it was logical to postpone the Regional Dialogue, and have it at the conclusion of the Project. This way it would be possible to incorporate the lessons learned, and further refine the focus of the Dialogue using the findings from the initiatives to be undertaken through the additional funding.

- By the end of December 2007. One synthesis report on lessons learned in mangrove restoration in Sri Lanka and Thailand was produced. A camera ready copy is available and it is currently in the process of printing. Capacity building workshops have successfully been completed in Sri Lanka and Indonesia. Local language materials have been produced and will be printed once the review and field manual has been drafted and are ready for field testing. On the completion of field testing this will be finalised and printed. A video documentary that has been developed will be disseminated during the regional dialogue with the other products.

## **Detailed outline of outputs achieved over 2007**

*The section below provides an outline of all outputs achieved under the agreed objectives over 2007.*

**Objective one: Document and share lessons and experiences on participatory approaches on post-tsunami ecosystem restoration, post-disaster reconstruction and sustainable coastal zone management**



***Output 1.1: Information and lessons learned on post-tsunami ecosystem restoration produced and shared with coastal policy makers and planners***

Document best practices and methods for mangrove restoration in Indonesia, Sri Lanka and Thailand

This output would be the result of synthesis of information and knowledge which would be generated through the commissioning of the papers and deliberation during the course of the Regional Dialogue. This Dialogue has been postponed till 2008 and hence this output.

Review ecosystem aspects of post-tsunami reconstruction in Sri Lanka and Thailand

The survey was conducted in Matara District (Sri Lanka) to assess the efficacy of post tsunami interventions in rehabilitating natural ecosystems affected by the tsunami. The main objective of this survey was to document the key lessons learned from ecosystem rehabilitation in a post disaster management context. Based on the information gathered from the survey and secondary information about national level interventions on post disaster reconstruction and rehabilitation, a case study report was drafted. A final analysis of this survey by the second week of February 2008 will provide insight into the successes and failures of the restoration and conservation work carried out by the agencies reviewed; and present a synthesis of the successes and failures of these restoration projects.

The field survey covered the entire coastal stretch of Matara District from Kudawella to Midigama. Observations were made in approximately 20 sites along the Matara coastal stretch, which falls under the jurisdiction of four Government Agent divisions (Matara, Weligama, Dewinuwara and Dikwella), and information was gathered on ground level coastal ecosystem rehabilitation and restoration. In addition to this, three interventions implemented by separate organisations involved in post-tsunami coastal resource rehabilitation and restoration projects were reviewed. These were a). Rehabilitation of Thotamune coastal area (Implementation Agency – University of Peradeniya collaboration with the collaboration of Municipal council of Matara); b). Rehabilitation of Epitamulla (Kamburugamuwa) coastal area (Implementation Agency - Visura Development Foundation); and c). Rehabilitation of Midigama and Thappawatta coastal areas (Implementation Agency – Forest Department). The completed draft report of this study is currently being reviewed and finalised.

The review report of ecosystem aspects of post-tsunami reconstruction in Thailand was drafted during the 3<sup>rd</sup> quarter, and is currently under review. The report was based on a desk review of project reports and other relevant sources, supported by interviews with key personnel involved in the projects being reviewed, as well as with various local-level officials. The main findings of the review highlighted the fact that there has been relatively little coordination of environmental rehabilitation efforts between the concerned NGOs, aid agencies and government departments. It was noted that some of the rehabilitation efforts have had unintended negative consequences to certain groups of people, as well as negative conservation implications. It has been very difficult to obtain clear evidence of the success of environmental rehabilitation efforts because data is often of poor quality. For example figures for mangrove restoration are given but without supporting details of location and survival rates. Much of the work done has been site-specific and lacks a coordinated approach or an overall landscape approach. In addition to this the review has provided an understanding of the elements that will contribute to

the success of future interventions as well as potentially improving ongoing activities. The review is currently being revised and edited, and the final product will be available by the 1<sup>st</sup> week of February 2008.

Establish and maintain web-based portal for disseminating and sharing of project information

A project website has been uploaded at <http://www.iucn.org/places/asia/oapn> . Updates are being carried out regularly by the IUCN ELG2 knowledge management unit.



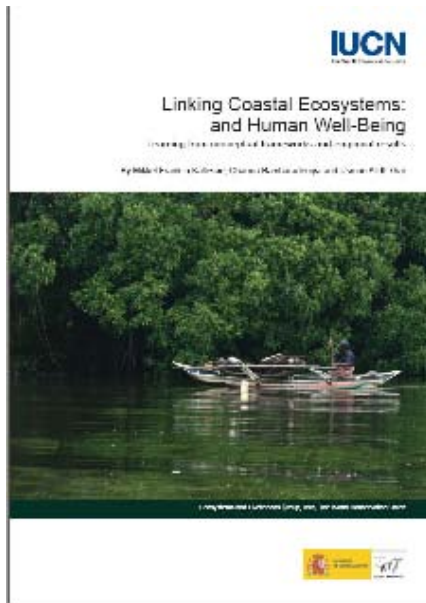
Figure 1: The OAPN project website

**Output 1.2: Awareness materials on the links between mangrove restoration and livelihood security produced and shared at the local level**

Produce English language synthesis report

A synthesis report on *Linking Coastal Ecosystems and Human Well-Being: Learning from Conceptual Frameworks and Empirical Results* has been completed and is currently in press. This report builds on OAPN phase I and presents a framework which illustrates the various components of an integrated ecosystem services and human well-being assessment. The report highlights the results from phase I as well as other studies, provides an extended awareness on the value of the coastal ecosystems, their products and services for human well-being, and illustrates the data requirement for

undertaking an integrated ecosystem services and human well-being assessment as well as presenting common indicators to be used for establishing a baseline with supporting examples.. The synthesis report represents a valuable tool for coastal conservation and development planners to act on and examine the impacts of management actions on human well-being.



**Figure 2: Synthesis report on “Linking Coastal Ecosystems and Human Well-Being”**

Produce local-language awareness materials on mangroves and livelihoods in Indonesia, and Sri Lanka

A key scientific paper produced by Robin Lewis *Ecological Mangrove Restoration in Indonesia* has been translated into Bahasa Indonesia, and augmented with the use of mangrove restoration "before and after" images. Another manual was produced based on the challenges made by Brian Walker and David Salt, authors of *Resilience thinking applied to Indonesia: a look at the resilience of Indonesia's Mangrove forest as socio-ecological systems with reference to potential thresholds*, to apply the principles of resilience to mangrove management. The original paper looked at key concepts such as thresholds, adaptive capacity, key slow moving variables, and the pitfalls of optimisation in the context of Indonesia's mangroves. It also provided 4 case studies profiling four separate mangrove forests in Indonesia with an analysis of differing states of social-ecological resilience. The purpose of this manual is to assist Indonesian managers to understand concepts regarding resilience, and to undertake resilience assessments in their stewardship areas.

In Sri Lanka, a brochure examining issues of resilience and mangrove management has been produced in English and this is currently being translated into Tamil and Sinhala..

An awareness poster on *Ecological Mangrove Restoration: Six Steps to Ecological Mangrove Restoration* has been completed by the Mangrove Action Project (MAP) Indonesia in English and Bahasa Indonesia. An awareness poster on *Post Disaster Rapid Coastal Assessment* has also been completed in Bahasa Indonesia by MAP.

Two information banners have been produced by IUCN ELG2, on *Climate Change and Natural Disasters* and *Indian Ocean Coast Under Threat: Mangroves for the future is a regional initiative to sustain livelihood with healthy ecosystems*. The former discusses the potential impacts of altered weather patterns caused by climate change on natural systems, while the latter provides information about the Mangroves for the Future (MFF) initiative and its implementation.



Figure 3: Information banners produced on climate change and MFF

**Output 1.3: Multi-stakeholder regional dialogue for sharing of information, experiences and lessons learned on natural disasters, coastal ecosystems and protected areas held for Indian Ocean countries**

Hold a Regional Dialogue

This activity has been postponed and the plan is to conduct it at the end of the project. This is owing to the fact that lessons learned and information gained from the activities can be better discussed in the multi-stakeholder platform and dialogue that will take place.

**Objective two: Enhance the capacity of agencies involved in post-tsunami reconstruction to incorporate participatory eco-restoration approaches in a post-disaster context**

***Output 2.1: Capacity building for post disaster environment assessment and management among conservation agencies***

Conduct field training courses in rapid environmental impact assessments and participatory eco-restoration practices in Indonesia, Maldives and Sri Lanka

Under the project, 3 field training courses have been conducted in Sri Lanka and Indonesia. A 5-day training workshop for capacity building of local NGOs and government departments in the field of mangrove restoration and rapid assessments was held in Indonesia at Simeulue Island, Aceh from July 9-13. The workshop was sponsored by the OAPN project with additional support from Australian Red Cross, IUCN-Mangroves for the Future and the Norwegian Red Cross. The workshop had three foci; 1) Ecological Mangrove Restoration 2) Small-scale sustainable livelihood development in mangrove areas 3) Community-based and collaborative mangrove management. The workshop emphasised hands-on learning methods, and prepared participants for follow-up action taking at the local level. Participants were educated on scientific mangrove restoration, community based mangrove management for conservation and sustainable utilisation, fisheries product value addition, non timber forest products collecting and processing, fish and crab trap making and community mapping. In addition, a policy session was conducted and consisted of three activities; 1) presentation on community based mangrove management in Indonesia, 2) discussion about the concept of policy and legislation, 3) simulation on problem identification and policy formulation.

A District level workshop was held in Hambantota District, Sri Lanka, between 16-17th of October to address the environmental concerns of those involved in disaster management. There were 24 participants from different government and non government organisations, who are actively engaged in post tsunami rehabilitation and reconstruction activities in the District. Participants for the workshop included individuals from the Forest Department, the Biodiversity Secretariat of the Environment Ministry, the Coast Conservation Department, the National Aquatic Resources Agency (NARA), the Department of Wildlife Conservation, the Small Fisheries Federation, Sewalanka Foundation, and district disaster management coordination body. The training workshop was a mix of formal presentations, structured discussion, and included one site level field trip. Hambantota District was selected due to the fact that the local district coordination mechanism is functioning effectively in this area, and there was a high perceived need given the range of environmental issues related to post-disaster management after the tsunami that the District is wrestling with. The main objectives of this workshop were to increase knowledge and awareness on the disaster management cycle, to empirically observe the level of environmental integration into post-Tsunami interventions, and to develop an environmental checklist on disaster management; to influence national policy on environmental assessment to incorporate impacts of potential disasters into the national EIA process. As an output of the workshop, IUCN was able to produce a draft document examining how to incorporate disaster management into the national EIA process. The draft document was circulated to national level professionals and will be finalised in 2008.



CARE organized a three day workshop in Hambantota, Sri Lanka between August 15-17 on Emergency Preparedness Planning. IUCN personnel participated as resource persons, and were requested to sensitise CARE staff to environmental issues. IUCN held a one-day session about using environmental safeguards in Emergency Preparedness Planning. An output of this workshop was a draft environmental checklist for disaster managers and a draft proposal to incorporate impacts of potential disasters into the national EIA process. The documents have been finalised and will be field tested in March 2008 in a follow up workshop with CARE International.

***Output 2.2: Field manual produced to guide Protected Area managers and conservation practitioners in post disaster coastal ecosystem assessment and restoration***

Produce and disseminate field manual on post-disaster coastal ecosystem assessment and restoration

A field manual on integrating environmental safeguards into disaster management has been completed. It will be field tested throughout the year 2008 at least in two field sites in two countries. Based on the outcomes of the field testing the manual will be revised and published in 2008. Part 1 of the manual discusses and provides information on the links between sustainable living, ecosystem well-being and human well-being in Asia, the value of coastal ecosystems, the difference between natural hazards and natural disasters, risk and vulnerability, natural hazards, natural disasters, and climate change. Part 2 of the manual discusses and provides information on the disaster management cycle, working summary sheet for integrated assessment, detailed biodiversity assessment techniques, steps, stages and methods for the valuation of wetlands and descriptions of different valuation techniques, and detailed livelihoods assessments.

**Achievement of milestones**

Milestones		Achievement this quarter (end Q1)
Q1	Project planning matrix, workplan and milestones have been developed	Achieved
Q1	Awareness raising materials have been designed for Sri Lanka and Thailand	Achieved
Q2	Synthesis report on lessons learned in mangrove restoration in Sri Lanka and Thailand has been produced	Achieved
Q2	Project website has been designed	Achieved
Q2	Case studies on lessons learned in Sri Lanka and Thailand have been produced	Achieved
Q3	Capacity-building workshops have been held in Indonesia, Maldives and Sri Lanka	Achieved
Q3	Local language materials have been produced for Indonesia, Maldives, Sri Lanka and Thailand	Achieved
Q3	Draft field manual has been produced	Achieved
Q3	Draft field manual has been pilot tested	Achieved
Q4	Field manual has been produced	Slight Delay (draft available)

Q4	CD Rom of field manual and other materials has been disseminated	Postponed till 2008
Q4	Regional dialogue has been held	Postponed till end of project
Q4	Country status reports have been produced for Sri Lanka and Thailand	Achieved

## Lessons learned during the OAPN phase II period

Working with multi-disciplinary organisations is important for the success of project implementation and sustainability, and this was something that contributed hugely to the success of project activities during 2007. The decision to go into partnership with Mangrove Action Project and Australian Red Cross has proven to add great value to the project outputs. As well as increasing the reach of the OAPN Project to selected areas in Indonesia, such alliances have allowed for the experiences gained by these two organisations to further enhance the lessons learned dialogue. These strategic partnerships will support the mainstreaming of conservation aspects into disaster rehabilitation efforts of aid agencies like the Red Cross.

During the field assessments both the IUCN Sri Lankan and Thailand Country Offices observed the relatively low level of coordination effort by the various NGOs, aid agencies and government departments in their post-tsunami rehabilitation activities. Much of the work was found to have been done on a site-specific basis, lacking a coordinated approach or an overall landscape approach. Avenues should be identified to increase levels of communication between the different agencies. In addition to this, there is a lack of written records of post tsunami rehabilitation and restoration activities in tsunami affected countries. This is mainly due to lack of proper coordination and lack of a central system to gather information that should be made available for future use. It was observed that, on completing their discrete project activities, organisations involved in post-tsunami rehabilitation would often leave the project area or country without leaving a record of the activities conducted. Large international and national organisations, and even government departments, have failed to document their experiences or lessons learned in implementing those projects. It should be emphasised that the establishment of a common culture of information management and documentation of lessons learned would be a necessity for the smooth functioning of future projects.

The issue of poor practice resulting in poor outputs, or at times negative impacts highlights the need to promote accurate record keeping and regular monitoring. Such systems not only allow for the documentation of progress made in rehabilitation activities, but will help identify any negative impacts that project actions may be having, and identify intervention strategies for dealing with these.

The failure to circulate products such as guidelines, reports, awareness papers widely to stakeholders is one constraint in promoting proper coastal ecosystem rehabilitation and conservation. Other resources, such as training manuals and field manuals are not used effectively, and best practice guidelines are often not referred to or followed by coastal resource managers due to a lack of resources. Establishing a mechanism to improve information flows and systems to assist managers to absorb and apply findings on the ground, are crucially important steps.

## Impacts of Project Activities

Under the project training of coastal Protected Area (PA) managers in Sri Lanka and Indonesia has been carried out to enhance their technical capacity to undertake assessments and sustainable PA management. Furthermore, by providing technical support in conjunction with training to improve the practice of development organisations, the project has been able to promote best practice, in considering the environmental implications of development activities and to improve the focus on disaster risk reduction activities in the design and implementation of projects. The production of awareness raising materials such as local language information papers, posters and banners, has helped to build local capacity in coastal resource management, ecological mangrove restoration, conservation of mangrove and other coastal resources, and the sustainable use of mangrove resources for the enhancement of local livelihoods. It is anticipated that the project will have longer-term benefits in terms of increased awareness of PA managers, coastal communities and local authorities. Perhaps most importantly, via its approach of working through existing local organisations that are permanently operating in coastal areas, and setting in place long-term capacity and interest, it is hoped that restoration activities will continue in the future and be sustainable beyond the immediate project lifetime. This was an important aim of the project and the impetus behind the use of the participatory, community-based approaches as an integral part of the project design. Continuity and sustainability of results will also be achieved due to the fact that the guidelines and other resources provided will be incorporated in the coastal resource rehabilitation and management activities of stakeholders and replicated in actions outside the project scope.

The review of lessons learned in post-tsunami rehabilitation and reconstruction in Sri Lanka and Thailand will be used in future coastal ecosystem rehabilitation and conservation work. The synthesis report on *Linking Coastal Ecosystems and Human Well-Being: Learning from Conceptual Frameworks and Empirical Results* will assist coastal conservation and development planners to act on and examine the impacts of their activities on human well-being and to plan studies and assessments on PAs. The institutional strengthening of community-based organisations and other partners, as well as the training provided on technical aspects of mangrove restoration has benefited the communities considerably. Awareness-building and training in rapid impact assessment are likely to further catalyse improved knowledge of and participation in mangrove restoration of PA authorities who were involved in the project and who will also champion the cause of mangrove restoration amongst the wider community.

Phase I of the project promoted mangrove forest restoration in government institutions by influencing stakeholders with practical and policy-relevant information briefs, combined with roundtables at all levels that created a forum for local villagers, fisher folk, business people, and community organisations to discuss important issues in a cooperative forum. From these fora it has become apparent that post tsunami restoration of coastal ecosystems cannot be viewed in isolation but are part of the broader issues relating to coastal zone management. Phase II of the project mainly concentrated on the documentation of lessons learned from Phase I and on the production of awareness materials to fill the awareness gaps of PA managers, local organisations and community. The project has provided stakeholders with the knowledge information tools to plan and



undertake ecological and socio-economic assessment in PAs and prepare sound plans for sustainable management of coastal resources that enhance overall benefits for local communities.

Over the period that this project was being implemented, IUCN has taken a lead role in building on the needs and experiences emerging from post-tsunami reconstruction in order to develop a long-term initiative to strengthen coastal ecosystems and livelihoods in Indian Ocean Countries. *Mangroves for the Future* was developed over the course of 2006 as a multi-stakeholder collaborative platform for action in coastal ecosystem restoration for sustainable development, and has now commenced implementation with major partners including the governments of India, Indonesia, Maldives, Seychelle, Sri Lanka and Thailand, UNDP, UNEP, FAO, CARE, WWF and Wetlands International. The knowledge, experiences, lessons and partnerships gained from this project have strengthened considerably the development of *Mangroves for the Future*, and fed into its design and programmes of work.

## Annex

### List of documents produced under the project

	<b>Type of document</b>	<b>Title</b>
1	<i>A synthesis report</i>	Linking Coastal Ecosystems and Human Well-Being: Learning from Conceptual Frameworks and Empirical Results
2	<i>A field manual</i>	Integrating environmental safeguards into disaster management
3	<i>OAPN Website</i>	<a href="http://www.iucn.org/places/asia/oapn">http://www.iucn.org/places/asia/oapn</a>
4	<i>A review report</i>	An Assessment of Post Tsunami Restoration and Conservation Initiatives in Coastal Stretch of Matara District of Sri Lanka
5	<i>A brochure</i>	The Mangroves: Wonder Beyond Seascape
6	<i>A Video documentary</i>	Introduction to mangroves of Sri Lanka
7	<i>A review report</i>	The post tsunami restoration and conservation initiatives/projects and synthesis on lessons learned in Thailand
8	<i>A scientific paper</i>	Ecological Mangrove Restoration in Indonesia
9	<i>A Manual</i>	Resilience thinking applied to Indonesia: a look at the resilience of Indonesia's Mangrove forest as socio-ecological systems with reference to potential thresholds
10	<i>An awareness poster</i>	Ecological Mangrove Restoration: Six Steps to Ecological Mangrove Restoration
11	<i>A policy paper</i>	Grass root mangrove policy development in Indonesia
12	<i>A banner</i>	Climate change and natural disasters
13	<i>A banner</i>	Indian Ocean Coasts under Threat: <i>Mangroves for the Future</i> is a regional initiative to sustain livelihoods with healthy ecosystems