# Rehabilitating Coastal Ecosystems in a Post Tsunami Context:
## Restoration of Mangroves in Sri Lanka and Thailand

End of Project Report
March 2007

Ecosystems and Livelihoods Group

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| **Name of project** | Rehabilitating Coastal Ecosystems in a Post Tsunami Context: Restoration of Mangroves in Sri Lanka and Thailand |
| **Start date** | October 1 2005 |
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# 1. Background to the project

The earthquake that occurred on 26 December 2004, and the tsunamis that followed it, brought widespread devastation to the countries around the Indian Ocean rim. Around 250,000 people were estimated to have lost their lives or to be missing, many more were rendered homeless, and a total of nearly 5 million people are thought to have been affected directly by the disaster.

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. In addition to the protective effect of these ecosystems, mangroves are key to local livelihoods by providing 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.

The countries that were hardest hit by the tsunami — India, Indonesia, Sri Lanka, and Thailand — were all among those that experienced a net loss in mangrove cover over the last ten years. While almost 40 per cent of the world's mangroves are concentrated in Asia, the region also accounts for the highest loss in mangrove area over the last decade. More than half of the total area (some 208,220 ha) of Thailand's mangrove forests disappeared between 1961 and 1993, and Sri Lanka has also suffered a devastating reduction in mangrove areas. This loss can primarily been attributed to the large-scale conversion of mangroves for fuelwood cutting, conversion to shrimp ponds, agricultural encroachment, development of settlements and tourism infrastructure development.

As became all too clear in the aftermath of the tsunami, loss and degradation of these vital natural ecosystems impacts heavily on coastal populations — in economic, livelihood and social terms, as well as through the loss of vital life support and protection services. As post-tsunami reconstruction took place, it was clear that there was an urgent need to restore and rehabilitate mangroves and other coastal ecosystems which provide such valuable goods and services, and to ensure that these actions are implemented in a participatory and scientifically sound manner.

A massive international and national effort was mobilised to respond to the tsunami, involving a wide range of sectors, agencies and levels of scale. As part of these 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 considered in 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.

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.

The project was concerned primarily with working in and around Protected Areas (PAs). Established to protect important biodiversity and ecosystems, PAs provide a particularly important mechanism through which to achieve mangrove conservation, and comprise priority areas in which to commence mangrove restoration in tsunami-affected areas. The project thus intended to support immediate post-tsunami reconstruction efforts, as well as to strengthen the long-term conservation of coastal biodiversity and ecosystems through Protected Areas.

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). A 12 month grant (later extended to 15 months) of €200,000 was made available by OAPN to support this project, via an agreement signed with IUCN in August 2005.

# 2. Project summary

## Scope and focus

The project focused on demonstrating and piloting on-the-ground approaches to mangrove restoration and conservation in two countries which contain important and threatened mangrove resources, and which were among the worst affected by the tsunami: Sri Lanka and Thailand.

Within each country, a key Protected Area site (including its buffer zone and immediate surrounding area) was selected for piloting mangrove restoration activities. In Sri Lanka Kumana (Yala East) National Park was identified as a priority for mangrove restoration, and in Thailand Laemson National Park was selected as a project field site.

These sites were prioritised in consultation with government and other partners in Sri Lanka and Thailand based on their biodiversity and ecological importance, perceived role in providing coastal protection and socio-economic services, degree of tsunami damage, and level of current and future threat. They are located in areas where IUCN is active in supporting other elements of post-tsunami reconstruction, and is undertaking longer-term work programmes in support of protected area planning, and ecosystem and livelihoods support.

In addition to the government agencies who are responsible for managing Protected Areas, the ultimate target beneficiaries of this project were conceived as the communities who live in coastal areas, who depend on natural resources for their livelihoods, and whose settlements and infrastructure were affected by the recent tsunami. A particular emphasis was given to poorer and more vulnerable groups.

With an overall goal to restore mangroves in and around priority Protected Areas that were affected by the tsunami as a mechanism to strengthen ecosystem conservation and reduce the vulnerability of coastal populations in Sri Lanka and Thailand, the project had two objectives: to support and facilitate mangrove and coastal forest restoration in and around priority Protected Areas, and to document and share policy and technical information and lessons learned in order to promote the integration of mangrove conservation and restoration into post-tsunami reconstruction and coastal management processes. As outlined in the project planning matrix below, the project worked in two major areas to fulfil these objectives.

The project supported and facilitated on-the-ground mangrove restoration in two pilot sites, implementing these activities with the active participation of local communities and decision-makers, and drawing on the wide expertise and experience in mangrove restoration and forest landscape restoration within IUCN offices and networks in Asia and elsewhere.

An important innovation of the project was to work through local organisations to undertake mangrove restoration, thereby focusing on building grassroots capacity, enhancing the long-term sustainability of activities, and ensuring that ecosystem restoration was carried out in a participatory manner which benefited local populations and livelihoods.

The project also documented and shared policy and technical information and lessons learned, in order to promote the integration of mangrove conservation and restoration into post-tsunami reconstruction and coastal management processes. This included documenting and sharing lessons learned from the project itself, as well as synthesising other relevant information on coastal ecosystem restoration needs and methods.

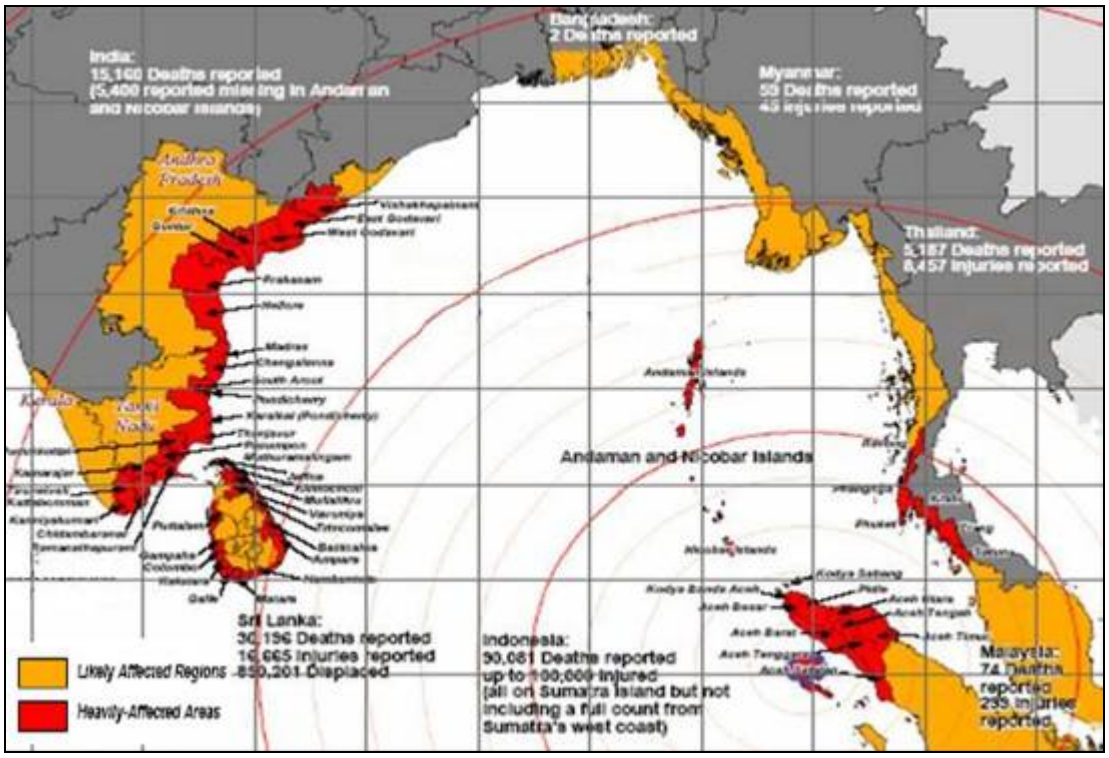
The project ensured that these materials were targeted to national and local needs and priorities, and were presented in useful and accessible formats for their target audiences. Efforts were made, at the same time, to promote dialogue and sharing of lessons learned between coastal planners, conservation agencies and local communities through facilitating a series of roundtables between the different sectors, agencies and groups involved in post-tsunami restoration.

## Project planning matrix

| Goal | | |
|---|---|---|
| To restore mangroves in and around priority Protected Areas that were affected by the tsunami as a mechanism to strengthen ecosystem conservation and reduce the vulnerability of coastal populations in Sri Lanka and Thailand | | |
| **Objectives** | **Main Outputs** | **Activities** |
| 1. Support and facilitate mangrove and coastal forest restoration in and around priority Protected Areas. | 1.1 Increased awareness by local communities and partners of the importance of coastal ecosystems and restoration activities | • Determining the long-term conservation and livelihood goals and benefits of mangrove restoration, in collaboration with local partners.<br>• Raising local awareness on the importance of mangrove ecosystems to biodiversity, coastal protection and livelihoods and on the need for sound management of both natural and rehabilitated systems.<br>• Information-sharing activities with local planners, administrators and local communities. |
| | 1.2 Effective institutional/ implementation structures in place to facilitate continuation of participatory mechanisms for implementing restoration strategies | • Facilitating the development of participatory mangrove restoration strategies based on forest landscape restoration approaches, particularly through capacity building of local authorities and communities to participate in management, and setting up of appropriate institutional/implementation structures. |
| | 1.3 Restoration and extension of mangrove forests in and around at least one protected area in each of Sri Lanka and Thailand | • Implementing mangrove restoration activities on a pilot basis in and around up to three PAs, including the establishment of mangrove nurseries at pilot sites. |
| 2. Document and share policy and technical information and lessons learned in order to promote the integration of mangrove conservation and restoration into post-tsunami reconstruction and coastal management processes | 2.1 Documentation on the environmental and socio-economic value of mangrove ecosystems | • Conducting rapid assessments of the environmental and socio-economic value of mangrove ecosystems. |
| | 2.2 At least two decision-makers guides/ sets of information briefs with targeted technical and policy guidance on mangrove restoration in Sri Lanka and Thailand. | • Producing information briefs for post-tsunami planners and decision-makers. |
| | 2.3 At least four multi-sectoral, multi-stakeholder dialogues on the integration of ecosystem concerns into post-tsunami reconstruction in Sri Lanka and Thailand, through which ecosystem restoration objectives more effectively considered into post-tsunami reconstruction and coastal management efforts through its inclusion in relevant reconstruction action plans. | • Through a series of targeted roundtables for national and local-level decision makers, disseminating information and strengthening awareness/capacity on factoring ecosystem restoration into post-tsunami reconstruction and coastal management. |

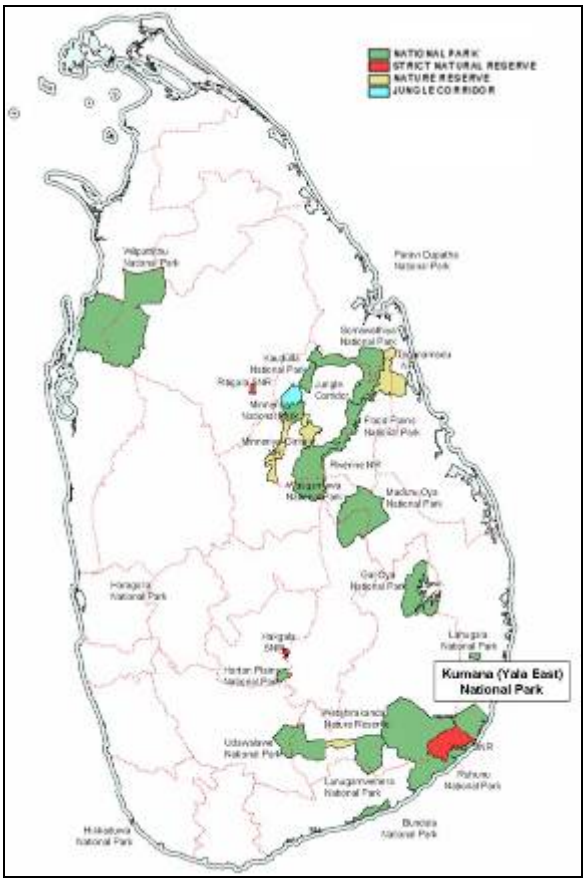
## Location of field sites

Areas in Asia affected by the Indian Ocean tsunami



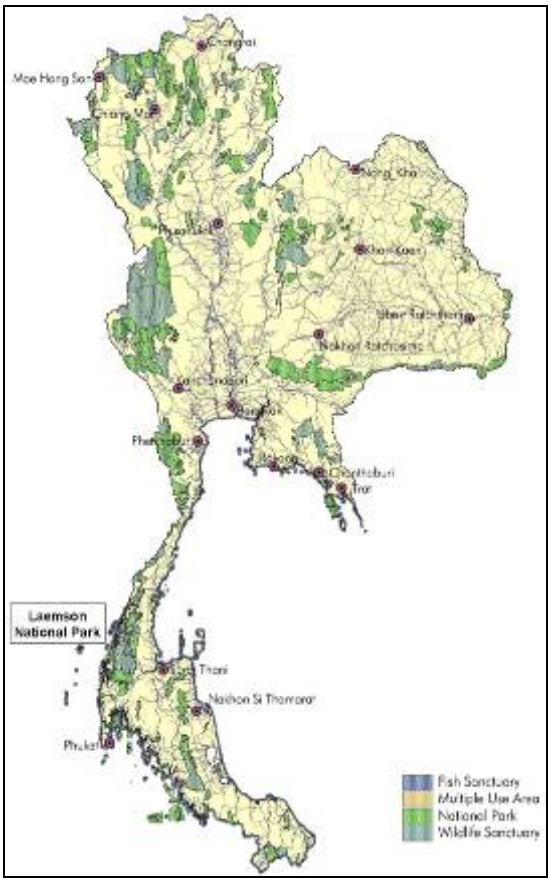

*Source: UN World Food Programme Emergency Preparedness and Response Unit 2005*

Location of Kumana National Park, Sri Lanka




*Source: Department of National Parks and Wildlife Conservation 2005*

Location of Laemson National Park, Thailand




*Source: Lower Mekong Protected Area Review 2001*

Kumana National Park, Sri Lanka

Kumana National Park is located on the south east coast of Sri Lanka, and includes important mangrove areas which were heavily impacted by the tsunami. The PA was formally gazetted in 1970, and covers an area of just over 181 $km^2$.

Mangrove swamps, covering about 200 ha, are the main feature of Kumana National Park. Over time, and particularly during the last two decades, mangrove vegetation has changed from a diverse habitat to a single species, *Sonneratia caseolaris*. Mangrove areas are surrounded by plains and jungle, and the flat terrain of the coast is broken by numerous, rocky outcrops. There are also large saline lagoons along the coast. Kumana is reputed for its avifauna, and large numbers of bird species congregate to nest in the mangroves in May-June, including large water birds such as Painted storks, Spoonbills, Black headed Ibises, egrets, cormorants and globally threatened Spot billed Pelicans.

Laemson National Park, Thailand

Laemson National Park is situated on the Andaman coast of Thailand, and includes important mangrove areas which were heavily impacted by the tsunami. The PA was established in August 1983 by royal decree, and covers a total area of 315 $km^2$, of which 85% is open water.

Laemson National Park consists of approximately 60 km of coastline and 15 islands. The principle terrestrial habitat is the extensive mangrove forests. Approximately half of the terrestrial coastal area of the park is covered by mangroves, which cover approximately 1,400 ha. The mangroves on the landward side of the National Park are dominated by *Ceriops tagal*, *C. decandra* and *Rhizophora apiculata*, while those on the seaward side are dominated by the pioneer species *Sonneratia alba*, *Avicennia alba*, *A. officinalis*, *A. marina*, and *Rhizophora apiculata*. The PA is rich in marine life, and there are many coastal and marine habitats present including coral reefs, open water, seagrass beds, mangroves, estuaries and beaches. All the parks islands are situated nearshore; these islands are unspoilt with no permanent habitation although they occasionally act as a refuge for fishing boats during monsoon storms.

# 3. Achievements and results

## Summary of results

The project has successfully achieved its intended goal, of restoring mangroves in and around priority Protected Areas that were affected by the tsunami, as a mechanism to strengthen ecosystem conservation and reduce the vulnerability of coastal populations in Sri Lanka and Thailand. It has generated the outputs specified in the agreement signed with OAPN. The key activities and outputs required to contribute towards the agreed goal and objectives for the grant, as elaborated in the project planning matrix, were implemented as envisaged.

Overall, the project has supported the establishment of mangrove nurseries in each of the pilot sites (Kumana National Park in Sri Lanka, Laemson National Park in Thailand) and has undertaken on-the-ground restoration of mangroves which were impacted by the tsunami and had been suffering damage and degradation over time. Six nurseries were established in Kumana NP and 27 ha of mangroves restored, one nursery was supported in Laemson NP and 5 ha of mangroves have been restored to date (at the end of the project, planting continues and the area under restoration is expanding). These activities were carried out by local community members, working in partnership with the government PA authorities and other civil society organisations.

The project also facilitated a series of dialogues and meetings at both national and local levels, targeted at PA-adjacent communities, coastal planners and decision-makers. Through these meetings, awareness was raised on the importance and value of mangrove ecosystems, information and lessons learned were shared between different stakeholder groups, and significant progress was made in integrating ecosystem concerns into post-tsunami reconstruction process in Sri Lanka and Thailand, and into longer-term coastal planning. Targeted capacity-building and training on ecosystem restoration was provided to both government PA staff and local communities.

Documentation was produced and shared on technical and policy aspects of mangrove restoration and conservation, including reports on studies on the socio-economic value of mangroves in both countries, and decision-makers guides/information briefs on the conservation benefit of mangroves and restoration site characteristics and conditions.

Specifically, the project has achieved the following results (as documented in detail in project quarterly reports):

- By the end of December 2005, an inception meeting had been held to bring together 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. Field visits were organized to finalise site selection, and to build rapport with local stakeholders.

- By the end of March 2006, awareness and information-sharing meetings had been organised with local communities, PA staff and other organisations operating in and around the project sites and at the national level. Preliminary data collection had been completed on the socio-economic value of mangroves in both countries.

- By the end of June 2006, participatory restoration strategies had been developed in each field site with the support of community based organizations. Mangrove nurseries had also been established.

- By the end of September 2006, mangrove restoration activities had been successfully completed in one pilot site, and nursery establishment and site preparation works had been undertaken in the other. Further national dialogues had been organised, and information briefs for decision-makers prepared and disseminated.

- By the end of December 2006, mangrove restoration work had been completed in both field sites, and studies on the socio-economic value of mangroves had been finalised in each country.

## Value added of the project in relation to its expected outputs

Objective 1: Support and facilitate mangrove and coastal forest restoration in and around priority Protected Areas

*Output 1.1 Increased awareness by local communities and partners of the importance of coastal ecosystems and restoration activities*

Awareness activities involved local communities in the project field sites, government officials and field staff in project PAs and other local authorities, and government and non-governmental agencies involved in post-tsunami reconstruction and coastal management at both local and national levels. The project adopted four primary methods for information-sharing and awareness generation: distribution of written materials, awareness workshops, training sessions, and facilitating multi-stakeholder meetings and dialogues.

- At Kumana field site in Sri Lanka, an awareness workshop on mangrove restoration was organised with a local community-based organisation (a project partner in mangrove restoration), Wellipattanvilla Ekamuthu Biodiversity Environmental Conservation Society. This meeting aimed to raise awareness on the ecological and livelihood importance of mangrove ecosystems, as well as to determine the local needs and goals from undertaking mangrove restoration. It was attended by more than 75 community members, 15 students and 7 local government officials from Forest Department, Coast Conservation Department and Central Environment Authority. Topics discussed included the importance of intact mangrove ecosystems, the need for mangrove restoration, and key damaged and degraded sites that were in need of restoration. The meeting facilitated the formation of community sub-groups to undertake nursery establishment and mangrove restoration works under the project. The members were also trained in post planting care and monitoring to minimise plantation losses and to ensure long term survival.

- At the meeting organised by Wellipattanvilla Ekamuthu Biodiversity Environmental Conservation Society ,training was provided to participants in mangrove planting techniques. In addition, the project provided training to Panama Abesinghapura Small Fisheries Society (also a project partner in mangrove restoration) in post-planting care and monitoring to minimise mangrove losses and to ensure long-term survival.

- At Laemson field site in Thailand, three community meetings were held which involved 112 community members from the local villages of Ban Pak Pak Triuma, Ban Bang Kluay Nok and Ban Bang Ben. These meetings aimed to raise awareness on the ecological and livelihood importance of mangrove ecosystems, as well as to determine the local needs and goals from undertaking mangrove restoration. Topics discussed included the protective, ecological and economic importance of intact mangrove systems. The meeting also served to increase local understanding of the conservation activities of the government Department of National Parks in Laemson National Park, including their Joint Management of Protected Areas Initiative.

- Three local roundtable meetings were also held in Thailand which brought together local communities and government planners and administrators in Ranong and Phang Na Provinces. These meetings aimed to facilitate and stimulate discussions and information-sharing between different coastal stakeholders, and to develop a joint strategy for mangrove restoration under the project. The meeting facilitated the development of a coordinated approach to mangrove restoration, and promoted cooperation between the different partners in project activities.

*Output 1.2 Effective institutional/implementation structures in place to facilitate continuation of participatory mechanisms for implementing restoration strategies*

The project aimed to facilitate the development of participatory mangrove restoration strategies based on forest landscape restoration approaches, through capacity building of local authorities and communities to participate in management, and setting up of appropriate institutional/implementation structures to undertake restoration.

Thus, in each of the project field sites, significant effort was devoted to identifying the most appropriate institutional structure for implementing mangrove restoration, which was based on existing organisational structures and acted to strengthen local capacity and participation in ecosystem conservation. After a process of stakeholder analysis, consultation, dialogue and joint

planning, agreements were signed with the identified institutional/implementation structure to undertake mangrove restoration in each site.

- At Kumana field site in Sri Lanka, Panama Abesinghapura Small Fisheries Society and Wellipattanvilla Ekamuthu Biodiversity Environmental Conservation Society were identified as the primary partners for the implementation of mangrove restoration activities. Both are community based organisations whose membership comprises individuals who both depend on coastal ecosystems and who wish to conserve mangroves, and which were already closely engaged in post-tsunami reconstruction in the locality. These community based organisations demonstrated capacity and willingness to undertake participatory mangrove restoration activities based on their membership, experience and relationship with the local communities.

- At Laemson field site in Thailand, a consortium of three institutional partners were identified to facilitate the development and implementation of mangrove restoration. These partners were the Laemson National Park Authorities, Kasetsart University Ranong Coastal Research Institute, and the of Marine and Coastal Resources Mangrove Rehabilitation Station, Ranong. These partners, who were already working together in and around Laemson National Park, had the strengths of a pre-existing mandate to research and undertake ecosystem conservation activities in the locality, as well as a strong past experience in dealing with restoration and conservation topics.

*Output 1.3 Restoration and extension of mangrove forests in and around at least one protected area in each of Sri Lanka and Thailand*

Before commencing on-the-ground mangrove restoration activities, a series of meetings and assessments were carried out in order to identify the sites, methods and plans for restoration as well as to ensure full stakeholder engagement and support in each country and field site.

- An initial inception meeting was convened in Bangkok which brought together 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. Field visits were then organised to finalise site selection in each of Sri Lanka and Thailand, and to build rapport with local stakeholders. Discussions were simultaneously held with the relevant government agencies at the national level and around the project sites, to explain the project objectives and to identify the project sites. Work was carried out to identify the exact location of the tsunami damaged mangrove sites in and around the project Protected Areas.

- During the course of these preliminary consultations and assessments, Bundala National Park in Sri Lanka (originally identified by government as a potential project site for restoration, along with Kumana National Park) was excluded from the project, as no significant damage to mangrove ecosystems were observed or recorded.

After the successful facilitation of awareness and information meeting, joint planning, training, development of restoration plans and finalisation of institutional agreements (as described above), mangrove restoration activities commenced in each of the project field sites.

- At Kumana field site in Sri Lanka, five nurseries were successfully established by by 150 members of Panama Abesinghapura Small Fisheries Society, including 75 women who raised around 35,000 *Rhizophora mucronata*, and 10,000 *Avicenia marina* saplings. These seedlings were used to replant a 20 ha area of mangroves in the buffer zone of Kumana National Park. Another nursery was established by 80 community members in Yala National Park, raising 25,000 *Rhizophora mucronata* seedlings, which were used to restore an area of 7 had in Buttawa Lagoon which had been damaged by the tsunami. The Park Warden and Staff of the National Park took additional responsibility for post-planting maintenance and casualty replacement in the restored area.

- Priorities for mangrove restoration in and around Laemson National Park in Thailand focused on biodiversity improvement, creation of a protective green belt, local income-generation, and coastal forest expansion The Laemson National Park beach nursery was supported by the project to raise 400,000 saplings of eight native species. These were used for the restoration activities carried out under the project, and will also meet future planting needs in the coastal zone as well as to meet community requirements in and around the National Park. During the

immediate project period, a mangrove area of 5 ha was replanted covering Bang Kluay Nok, Tung Nang Dam, Cheme and Pak Triam villages.

Objective 2: Document and share policy and technical information and lessons learned in order to promote the integration of mangrove conservation and restoration into post-tsunami reconstruction and coastal management processes

*Output 2.1 Documentation on the environmental and socio-economic value of mangrove ecosystems*

If mangroves and other coastal ecosystems are to be conserved over the long-term, a key need is to convince coastal planners and managers from "development" sectors of the economic and development wisdom of ecosystem restoration and conservation. At present there is little awareness or available information, among either national or local planners, of the benefits and values arising from coastal ecosystem conservation. To overcome these information and awareness gaps, and in support of field site activities, rapid assessments of the environmental and socio-economic value of mangrove ecosystems were conducted under the project around each of the field sites.

- At Kumana field site in Sri Lanka, the rapid assessment of mangrove economic values was undertaken focusing on Panama Village, one of the PA buffer zone communities. The study was initially delayed, due to poor security in the field site and in Sri Lanka as a whole. Within a framework of total economic value, a range of cost-based approaches and participatory valuation techniques were used to assess mangrove values. The study estimated that mangroves generate value of US $177.9 to US$ 494 per hectare per year for fish breeding and a value of US$ 392.5 per hectare for coastline protection.

- At Laemson field site in Thailand, the study was conducted in Ban Bang Man and Ban Naca villages near Laemson National Park. A combination of literature review and direct field survey techniques were used to generate the results. The study demonstrated that coastal communities rely heavily on mangrove ecosystems for their livelihoods, which is apparent by the diversity of uses mangrove ecosystem is put to. The present contribution of mangrove ecosystem to fisheries production is US$ 20,174 per household in Ban Naca and US$ 30,822 per household in Ban Bang..

*Output 2.2 At least two decision-makers guides /sets of information briefs with targeted technical and policy guidance on mangrove restoration in Sri Lanka and Thailand*

A number of information briefs were produced and disseminated, aiming to document and share lessons learned from the project as well as to synthesise and present other relevant information on coastal ecosystem restoration needs and methods. and on promoting awareness of the need to factor ecosystems into post-tsunami reconstruction

- In Sri Lanka, a brief was produced on the conservation benefit of mangroves, drawing on the findings of the socio-economic study as well as on other information and literature on the value of coastal ecosystems. This was targeted at coastal policy-makers, planners and decision-makers, and at NGOs and researchers working in coastal areas. A short document was also produced which synthesised and summarised information on the status of mangroves in the country, including their distribution, species composition and services provided. This intended to raise general awareness on mangroves among students, civil society and policy makers.

- In Thailand, two information briefs were prepared in response to requests made by government agencies and other partners working in coastal management. These highlighted the most critical issues in coastal zone natural resource management, and summarised information on current restoration practices of clear felling the areas prior to re-planting, diversity of species planted, the need for silvicultural practices to maintain diversity, linking community based models with national policy and the future role of mangrove related institutions after the mangroves are completely restored. These aimed to guide community members and government officials when undertaking coastal ecosystem restoration. In addition, a series of summary sheets were produced and disseminated which presented key data on five sites in which mangrove restoration is taking place in and around Laemson National Park: Tung Nang Dam, Pak Trium Village, Laemson National Park Nursery, Cheme Village, and Bang Kluay Nok Village. These sheets provide a quick reference guide and information base for those engaged in, or planning, mangrove restoration.

*Output 2.3 At least four multi-sectoral, multi-stakeholder dialogues on the integration of ecosystem concerns into post-tsunami reconstruction Sri Lanka and Thailand through which ecosystems restoration objectives more effectively considered into post-tsunami reconstruction and coastal management efforts through its inclusion in relevant reconstruction action plans.*

In order to foster better dialogue and understanding between the various groups, sectors and agencies involved in coastal management, and to promote the integration of ecosystem concerns into post-tsunami reconstruction, the project facilitated a series of multi-sectoral, multi-stakeholder dialogues in each of Sri Lanka and Thailand. These also served as important forums within which to share information and lessons learned on mangrove restoration, from the project and other sources.

- In Sri Lanka, two high-level round table discussions were held showcasing the mangrove restoration work undertaken in the project to government officials, policy makers and other stakeholders including the national disaster management centre. The purpose of the round tables was to share the experiences of coastal rehabilitation and ecosystem restoration with national level policy makers, post tsunami reconstruction and coordinating authorities, provincial and local authorities, INGOs, NGOs and local CBOs involved in post tsunami reconstruction and rehabilitation activities. Project dialogues also actively included the Consortium of Humanitarian Agencies, an apex organisation of national humanitarian agencies involved in post tsunami relief and rehabilitation efforts. As a result of this engagement, the Consortium requested that a special presentation be made to them on this project, giving an account of the project objectives and activities and emphasising the necessity and long term benefits of mangrove restoration through the active engagement of local communities, CBOs, NGOs and government officials.

- In Thailand, the project facilitated and organised four roundtable meetings at national, provincial and local levels and one that combined a training seminar and needs assessment on coastal zone management for Marine National Parks superintendents. The local-level roundtable was held at Ranong Coastal Resources research station with local participants from five village based conservation groups surrounding Laemson National Park. The participants identified various problems and outlined future actions particularly in particularly for sustainable fisheries. The provincial roundtable was organized with the support and participation of Ranong UNESCO Biosphere Reserve, Wildlife Fund, Thailand, Ranong Marine Fisheries Department and Ranong Coastal Resources Research station. The participants highlighted environmental issues affecting local communities, mangrove reforestation schemes and sustainable management of fisheries. The national level roundtable was attended by over 25 major stakeholders including NGOs, government agencies, and academician. The participants shared their views on different challenges in implementing specific projects and identified priorities for future.

# 4. Impacts of project activities

## Impacts of the project in addressing mangrove restoration

The project has directly restored 32 ha of damaged mangroves in and around Kumana National Park in Sri Lanka and Laemson National Park in Thailand. Furthermore, by establishing local nurseries, and building local capacity to raise and plant mangrove seedlings, it is anticipated that the project will have longer-term effects in terms of increased hectarages of mangroves restored. Perhaps most importantly, via its approach of working through existing local organisations who are permanently resident and operating in coastal areas, and setting in place long-term capacity and interest, it looks likely that restoration activities will continue in the future and be sustainable beyond the immediate project lifetime. This was an important aim of the participatory, community-based approaches that were employed by the project.

Mangrove restoration is a long-term process, and the areas replanted under the project are still in their early stages of growth. It is therefore too early to determine and assess the overall impact of the project in addressing mangrove restoration. Nevertheless, in addition to the physical areas replanted and the establishment of nurseries for future restoration work, there are some early lessons from participatory eco-restoration approaches guided by local authorities and community-based organisations.

The project has provided a good example of adopting participatory research and adaptive management approaches to mangrove restoration, thus minimising post-planting losses. This was in contrast to other examples of untimely and haphazard planting of mangroves in the aftermath of the tsunami (evident in many parts of Sri Lanka and Thailand), which resulted in very high mortality rate.

The project also clearly demonstrated the importance of mangrove ecosystems to communities, both in terms of protection and production values. The loss of mangroves is directly correlated to the loss of economic well-being of most of the communities engaged in the primary sector, as exemplified by the communities in the project field sites. The socio-economic assessment contributed significantly to the growing debate on the economic value of mangroves and other coastal ecosystems that have been until recently undervalued significantly in coastal planning and development decision-making. The economic assessment also brought out the economic importance of the shoreline protection functions that mangroves provide by acting as buffers against natural disasters. The restoration of mangroves from this experience underlined the importance as a coping strategy for the communities against external shocks and vulnerabilities including natural disasters, financial and psychological stress.

The institutional strengthening of the community-based organisations and other partners, as well as the training provided on technical aspects of mangrove restoration, has benefited the communities considerably. In addition, awareness-building and training of the Park Wardens is likely to further catalyse increasing knowledge of and participation in mangrove restoration within Protected Area Authorities who were involved in the project, who will also champion the mangrove restoration cause amongst the wider community.

## Social benefits derived from mangrove restoration

The project enabled communities in the field sites to both become more aware of, and capture in concrete terms, the value of mangroves and the role they could play in changing their lives. The establishment of the mangrove planting areas in buffer zones, in the long-run, would ensure that the communities with the support of the community-based organisations would benefit economically by sustainable managing and utilizing the mangroves which have been planted.

The involvement of the communities in mangrove restoration has provided them with income-generating opportunities to supplement their primary sources of income. Pilot restoration activities showcased to local communities the opportunities to earn supplementary income by planting economically important species like Nypa, which can provide non wood forest products in a short rotation cycle. The communities in the field sites are also likely to witness reduced damage from natural disasters as a result of the storm protection and shoreline protection functions performed by the mangrove ecosystems. Another important set of indirect benefits in both field sites which is of

value to local communities, many of whom rely on fishing for their livelihoods, is their role in providing habitat and protection to fish breeding and nursery.

The project also contributed importantly in the development of community social capital, in the form of networks and trust-building among local stakeholders in Protected Areas and coastal ecosystems. In addition, it is expected that mangrove associates including medicinal plants would proliferate in the restored mangrove ecosystem, in the near future. These medicinal plants would contribute positively towards improved health of the communities in project areas.

The project has favourably impacted on gender equality, as it has provided employment opportunities to women in terms of planting and management of the mangrove restoration areas. Special efforts were made to ensure that women participated equally in, and benefited from, project activities. The enhanced bargaining power as a result is likely to enable them to act as agents of change on community based sustainable management of coastal ecosystems including mangroves.

## Political impacts from promoting the integration of mangrove conservation and restoration into post-tsunami reconstruction and coastal management processes

The experience from this project has enabled IUCN to understand clearly the role played by coastal ecosystems, especially mangroves, in reducing the impact of natural disasters — not only as buffers but also because these ecosystems providing vital goods and services to the communities which help to reduce their vulnerability to disasters and stress. Being able to generate this type of very practical information and lessons has proved politically important and influential when shared with key decision makers as a result of IUCN showcasing the mangrove restoration carried out under the project as a best practice model.

The demonstration activities, methods and lessons learned have been disseminated to a wide audience in both Sri Lanka and Thailand, comprising not just conservation agencies and Protected Area authorities, but also “development” sector planners and policy-makers. Together with other work being carried out by IUCN and others, this information has proved to be extremely valuable in placing the conservation of mangroves and other ecosystems on the post-tsunami reconstruction and coastal development agendas.

As long-term planning is undertaken for coastal areas in the aftermath of the post-tsunami reconstruction process, progressively greater attention is being paid to the need and rationale of ecosystem restoration and conservation. For example, the greening of the coastal belt has now been accepted as policy by the Government of Sri Lanka in its post-tsunami reconstruction efforts. The government is also seriously concerned about environmentally sustainable reconstruction which does not destroy local environmental conditions in the coastal areas. In Thailand, government officials in the project area and in other areas articulated the beginnings of a shift towards viewing ecosystem inputs as equal in value to traditional infrastructure investments like road and building construction

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, and business people, and community organisations to discuss important issues in a cooperative forum. From these forums it was 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.

Over the period that this project was being implemented, IUCN has taken a lead role in building on the needs and experiences resulting 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

| Type of document | Title |
|---|---|
| Technical document (Sri Lanka) | Environmental and Socio Economic Value of Mangroves in Tsunami Affected Areas: Rapid Mangrove Valuation Study, Panama Village on the South Eastern Coast of Sri Lanka |
| Technical document (Thailand) | Ecological and socio-economic values of Mangrove ecosystems in tsunami affected areas: Rapid ecological-economic-livelihood assessment of Ban Naca and Ban Bangman in Ranong Province, Thailand |
| Decision-makers guide/ information brief (Sri Lanka) | Conservation Benefits of Mangroves |
| Decision-makers guide/ information brief (Sri Lanka) | Information Brief of Mangroves in Sri Lanka |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site summary sheet: Tung Nang Dam, Phang Nga Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site summary sheet: Pak Trium Village, Phang Nga Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site summary sheet: Laemson National Park Nursery, Ranong Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site summary sheet: Cheme Village, Ranong Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site summary sheet: Bang Kluay Nok Village, Ranong Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site site plan: Tung Nang Dam, Phang Nga Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site site plan: Pak Trium Village, Phang Nga Province |
| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site site plan: Laemson National Park Nursery, Ranong Province |
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| Decision-makers guide/ information brief (Thailand) | Mangrove restoration site site plan: Bang Kluay Nok Village, Ranong Province |
| Decision-makers guide/ information brief (Thailand) | Community Based Mangrove Rehabilitation Guidelines (in Thai Language) |
| Decision-makers guide/ information brief (Thailand) | Critical suggestions for effective mangrove restoration and conservation |
| Decision-makers guide/ information brief (Thailand) | Policies and emerging issues in coastal forest management in Thailand |

Cover picture:
Mangroves in Sri Lanka


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