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Coastal Ecosystems

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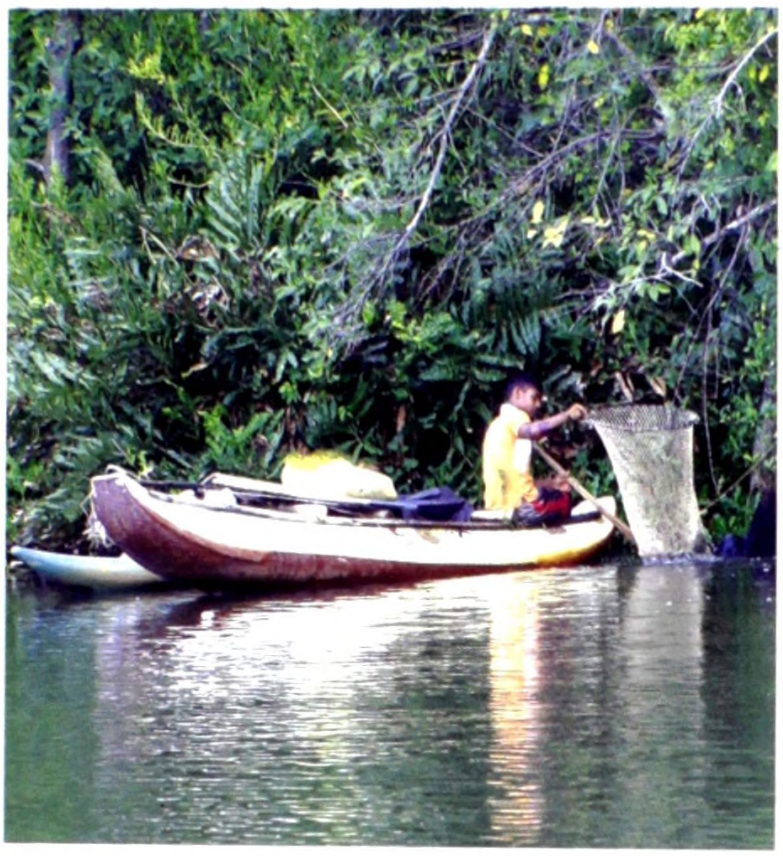
Mangroves for the Future: reducing vulnerability and sustaining livelihoods



Mangroves for the Future is a multi-agency, multi-country initiative for the long-term conservation and sustainable management of coastal ecosystems such as mangroves, coral reefs, wetlands, forests, lagoons, estuaries, beaches and sandy shores. It covers twelve tsunami-affected countries in South and Southeast Asia and the Western Indian Ocean. The initiative involves collaboration between multiple partners, including government agencies, NGOs and CBOs, research institutes and universities, UN agencies and other multilateral bodies. *Mangroves for the Future* thus provides a platform which brings together the efforts of different countries, sectors and agencies with a common goal to conserve and restore ecosystems, to sustain human livelihoods, increase resilience and reduce the vulnerability of coastal communities in the Indian Ocean Region.

Mangroves have been selected as the flagship for the initiative because of the recognition, as a result of the tsunami, of their key role in coastal ecosystem functions and processes. However, recognising that coastal management priorities are different in each of the participating countries, and that issues such as disaster mitigation and provision of sustainable livelihoods in coastal regions need urgent attention, *Mangroves for the Future* will take a broader approach. Issues to be addressed therefore include: support for sustainable livelihoods, vulnerability assessment and risk management, protected areas, restoration of coastal ecosystems, integrated coastal zone management planning, ecosystem valuation, and research, monitoring and assessment.

Launched in September 2005, the initiative has received enthusiastic support from the many organisations involved in coastal management and post-tsunami reconstruction. As a result of this, a detailed process of consultation and dialogue is being undertaken currently in tsunami-affected countries and at the global level, in order to identify priorities, needs and partnership arrangements, as well as to establish a comprehensive strategy and programme document. These will be presented to a donor round table in September 2006, where it is hoped that funding pledges will be made to support the *Mangroves for the Future* initiative.

Photograph: *Fishing with a hand net in a mangrove in Sri Lanka* © Sriyanie Miththapala

This newsletter deals with mangroves. Like other coastal ecosystems, mangroves are important not only because of their high conservation value, but also because they matter for livelihoods and economic development. Unfortunately, these critical coastal ecosystems have been severely degraded over time. This has seriously compromised their ability to provide the goods and services that are so vital to long-term livelihoods and sustainable development, as well as undermining their functions in maintaining the resilience and reducing the vulnerability of human settlements.

Mangroves: under threat and under-valued

Mangroves are among the world's rarest and most threatened ecosystems. Globally, coral reefs cover nearly twice the area of mangroves, and tropical and subtropical forests more than 125 times as much. Mangroves are also unique in that they thrive where no other vegetation can survive: in the transition zone between ocean and land, mainly in the tropics. The countries affected by the tsunami have more than 30,000 km^2 of mangroves with extensive areas in Indonesia, which contains almost a quarter of all the world's mangroves, Thailand, Myanmar, with lesser amounts in Sri Lanka and India.

Mangroves are home to a wide range of commercially important species of fish and crustaceans, and provide an array of livelihood products such as timber, fodder, fuelwood and medicines. They also provide essential services such as protection against extreme weather events and erosions, functioning as sponges to limit the impact of floods, retaining sediment carried in by rivers and floodwaters, and also trapping carbon, whilst converting these to useful nutrients.

Much of the area covered originally by mangroves has already been lost, and what remains is under severe pressure from human activities. More than a third of the world's mangrove forest has disappeared in the last two decades, and some countries have lost as much as 80 percent of this cover. At 3.6 percent, or something over 6,000 km^2, the annual global rate of mangrove loss far exceeds the rate of disappearance of tropical forests.

Despite their economic and ecological importance, mangroves remain under-valued and under threat. They are often considered as wastelands that should be cleared or filled. Prawn culture, domestic and industrial pollution are also serious threats. Inadequate freshwater flows, which are vital to healthy mangrove systems, through over-abstraction of upstream water, have also taken their toll. Yet, as has become all too clear in the aftermath of the tsunami, loss and degradation of these vital natural ecosystems impact heavily on coastal populations and countries in economic, livelihood and social terms, as well as through the loss of vital life support and protection services. There is an urgent need for mangroves to be conserved and better recognised for the important role that they play in supporting and protecting coastal communities. Good coastal management and rational resource use, coupled with protective measures for key areas, could reverse the current dangerous trend of mangrove over-exploitation, conversion and destruction.

Mangroves facts and figures

- Global mangrove coverage is estimated to be between 167,000 and 181,000 km^2
- Forty percent of mangroves occur in South and Southeast Asia regions
- The global rate of decline in mangrove forest cover is estimated at 3.6 percent a year
- Worldwide, there are over 700 protected areas containing mangroves
- Mangroves act as breeding grounds for fish, prawns and crabs. The annual market value of seafood from mangroves is estimated at US$7,500–167,500/km^2
- Mangroves fix and store carbon and can absorb an estimated 25.5 x 10^6 tons
- Mangroves are natural wastewater filters, absorbing pollutants such as heavy metals and other toxic substances and thus preventing them from reaching deeper waters

Mangroves prop roots (Rhizophora sp.)
© Sriyanie Miththapala

Fish catch, Sri Lanka
© Jerker Tamelander, IUCN

Coastal Ecosystems

Counting coastal ecosystems as economic assets

The last eighteen months have seen significant time, effort and funds invested in restoring and improving infrastructure that was damaged by the Indian Ocean tsunami, and in making plans for its future upkeep. However, one important aspect—natural ecosystems such as mangroves, beaches, wetlands, forests and coral reefs—has remained largely ignored.

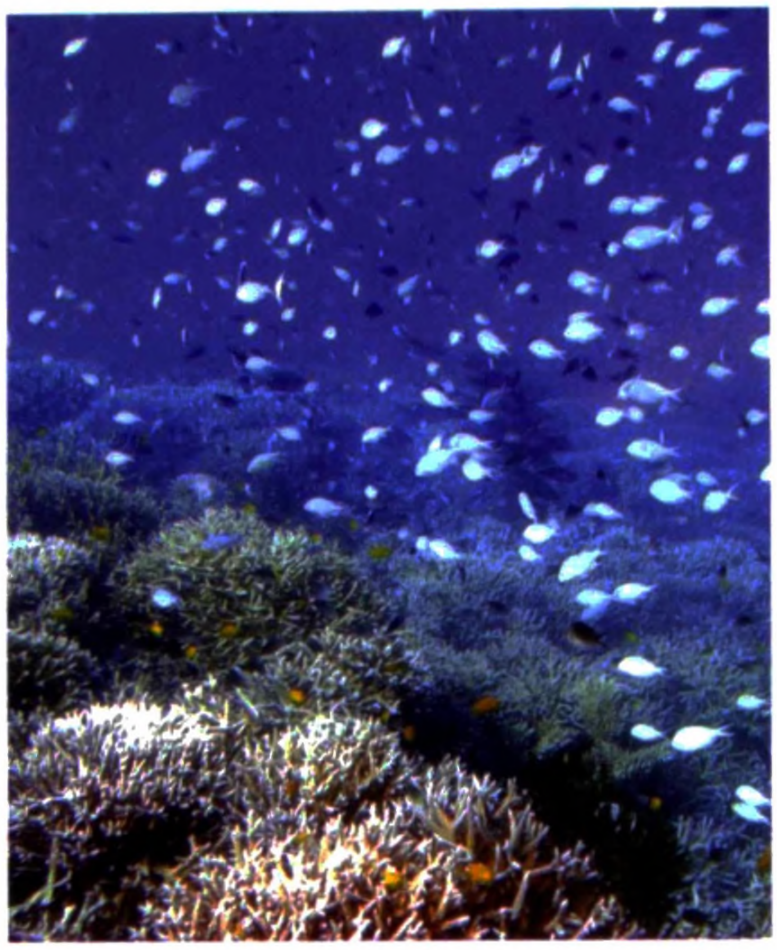
Most people are well aware of the role that resource-based industries such as fisheries and tourism play in coastal economies. There is perhaps less comprehension of just how important these goods and raw materials are in terms of their multiplier effects at local and national levels. In the Seychelles, for example, coastal and marine biodiversity contributes up to a quarter of all employment opportunities, one third of government revenues, and two thirds of foreign exchange earnings. In parts of Indonesia, traditional use of mangrove products has been valued at over US$3,000/year/ha, comprising up to a half of income among the poorest households. In Thailand, it is thought to contribute more than US$1,500 to household livelihoods, equivalent to almost a quarter of per capita GDP.

Protection against extreme weather events

What is much more poorly understood is the enormous contribution that ecosystems make in safeguarding coastal production and consumption, reducing vulnerability, and strengthening resilience. The benefits of mangroves for shoreline protection and storm damage control have been estimated to run into tens of thousands of dollars per km^2 in Sri Lanka and Malaysia. Studies carried out in Viet Nam show that the value over time of mangroves in protecting against extreme weather events lies around US$5,000 per km^2.

The value of coral reefs, including coastal protection, has been gauged to be hundreds of thousands of dollars per km^2 in Indonesia and close to a million dollars in the Philippines. In Sri Lanka, costs and damages arising from the degradation of coastal wetlands rise to hundreds of thousands of dollars per hectare in terms of lost water purification and flood attenuation services.

These values tell us an important story. Just as it is the case for any type of infrastructure, there is a strong economic rationale and a high payoff to invest in the restoration, management and maintenance of coastal ecosystems. In contrast, failing to do so—either in post-tsunami reconstruction, or within the context of longer-term processes—is not only short sighted in economic terms, but it may ultimately undermine many of the goals that so much time, effort and funds are being channelled into to provide cost-effective, equitable and sustainable development in coastal areas.



Seascape © Jerker Tamelander IUCN

Events

- International Conference and Exhibition on Mangroves of Indian and Western Pacific Oceans (ICEMAN), **21 - 24 August 2006**, Kuala Lumpur, Malaysia. Organisers: Maritime Institute of Malaysia
- International Disaster Reduction Conference (IDRC), **21 August–1 September 2006**, Davos, Switzerland Organisers: Global Alliance for Disaster Reduction, Global Disaster Information Network, UNESCO, UN International Strategy for Disaster Reduction
- Regional Technical Workshop: Coastal protection in the aftermath of the Indian Ocean tsunami: what role for forests and trees? **28–31 August 2006**, Khao Lak, Thailand. Organisers: FAO
- Coastal Zone Asia Pacific Conference CZAP, **29 August–2 September 2006**, Batam, Indonesia. Organisers: Coastal Development Centre (Thailand)
- Workshop on coastal area planning and management in Asian tsunami-affected countries, **27 - 29 September 2006**, Bangkok, Thailand. Organisers: FAO

Maximising the impact of mangrove restoration

Given the rapid disappearance of mangroves, the highest priority is to eliminate threats such as clearance for infrastructure, settlement and other developments, inadequate freshwater flow, and unsustainable use. Once the stresses are removed, ecosystems such as reefs and mangroves can recover naturally. However, this process is often too slow for human needs, particularly in locations where damage has been extreme, as was the case in some tsunami-affected areas. In these cases, there may be a real need for active restoration.

The rush of well-intended restoration projects after the tsunami was therefore understandable, given the new awareness of the importance of healthy ecosystems. But the desire for quick effects meant that, often, little attention was paid to the skills and technical knowledge needed. Mangroves became the focus for restoration as in some situations they undoubtedly helped save lives and infrastructure.

Furthermore, mangrove restoration appears a simple and inexpensive process. Propagules and seedlings can be planted by hand over large areas, using volunteers and local labour. However, mangroves are far more complex and diverse than the tangled roots, branches and mud might suggest.

Restoring a mangrove community to its full complement of biodiversity is very difficult, and there have been many recorded failures. Already many post-tsunami planting efforts are encountering problems, with high mortality of seedlings. A re-assessment of restoration programmes is needed urgently, and

Mangrove rehabilitation in Koh Phra Thong, an island off the Andaman coast of Thailand © IUCN

indeed, being done in some countries. Key principles to be observed are that:

- Restoration should be attempted only in suitable areas, i.e. those that once had, or still have, mangroves. Planting elsewhere is often unsustainable and can be damaging, for example, reducing feeding habitats for water birds.
- Depth, duration and frequency of tidal flooding must be studied before restoration starts, as this dictates whether the area is suitable, and what varieties of species can be planted.
- It's important to understand what initially damaged the mangrove; if the stress is still there, restoration may be useless. For example, shrimp farming often destroys mangroves but also irreversibly alters the soil, making it unsuitable for mangroves.
- Monocultures will not provide the full ecosystem services of a natural mangrove community, a mix of species is needed.

The key message for ecosystem restoration is: "Don't start projects without doing the necessary background work and research. In the long-run, this will save you money and ensure that you have a much greater impact."

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