

Mangroves for Coastal Resilience

Coastal wetlands such as mangrove forests strongly contribute to the safety, food security and income of tens of millions of people throughout the tropics. Wetlands International has helped to restore and conserve thousands of hectares of mangrove forests, closely working with coastal communities. We aim to increase coastal resilience and reduce disaster risk by championing and enabling management, restoration and sustainable use of this invaluable ecosystem.

Mangrove forests serve as natural assets and provide insurance for coastal areas all over the world. They are among the most productive ecosystems, providing fuel wood, timber and fish. As such, mangroves are engines for economic growth. They also act as natural buffers against erosion and extreme weather, reduce coastal erosion and intrusion of salt water. This coastal ecosystem is biodiversity-rich, connecting freshwater and saltwater environments and providing habitat for many specialised animal species such as waterbirds, and a wide variety of mammals, gastropods and

shellfish. Mangroves are especially valuable as a nursery and breeding area for many kinds of fish, including commercially important species. Around 30% of the fish catch and nearly 100% of wild shrimp catch in Southeast Asia are located on mangrove areas and in Queensland, Australia, mangroves support 75% of commercial fish species. Additionally, mangrove forests have an important climatic function; they sequester carbon through accumulation in their biomass and through burial in sediment deposits.

Rapid loss of mangrove forests

Despite their biodiversity and economic values, many native mangrove ecosystems along the tropical shorelines of Asia, Africa and Latin America are severely degraded or completely destroyed. The total global mangrove area has declined by 25% from an estimated original 20 million ha. The current mangrove deforestation rates are estimated at 0.66%, 3-5 times as much as the average overall global forest loss. Shrimp aquaculture in Asia, in particular, has caused the removal of large tracts of mangroves. Urban development, pollution and over-harvesting of wood in the coastal forests and dynamite fishing are also taking their toll.

The reason for such losses is due to lack of recognition of the fundamental role of mangroves as a vital resource base for coastal economies and the ignorance of their buffering role for communities living on vulnerable coasts. Existing knowledge on mangrove values remains highly fragmented, conflicting and sometimes confusing or difficult to be accessed by non-scientists.



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Mission:

To sustain and restore wetlands, their resources and biodiversity

Box 3 Mangrove-based coastal defence strategies

Mangrove forests play a crucial role in disaster risk reduction. As a natural defense system, mangroves are capable of sheltering and buffering coasts from a range of possible hazards coming from the sea, such as tidal waves, hurricane, storms, and even tsunami.

Together with Deltares, we promote the implementation of innovative hybrid-engineering techniques - an approach that combines 'green' ecosystem-based and 'grey' infrastructural solutions as to accomplish protection against storms, floods and erosion. The mangroves involved in hybrid-engineering not only offer coastal protection but also store carbon, harbor a rich biodiversity and sustain fish production. Post-disasters, mangroves provide early sustenance.

Currently, we are developing new methodologies to enable mangrove-based coastal defense systems. These methodologies will be tested in the field through key pilot activities together with local stakeholders.

Box 4 Sustainable Shrimp Production

The main driver of the loss of mangrove forests in the world is their conversion for aquaculture, particularly shrimp farms. It was estimated that by the year 2000, over 1.2 million ha of mangroves had been converted into aquaculture ponds in Southeast Asia alone. Many of these ponds are exhausted within a few years and subsequently abandoned.

We advocate for sustainable aquaculture production in key mangrove countries such as Indonesia and Thailand. Specifically, we promote the silvo-fishery and poly-aquaculture approaches which combine the replanting of mangroves near and inside shrimp and fishponds. These approaches not only sustain a steady and diverse shrimp and fish production, but also reduce the vulnerability of coastal areas to strong winds, tidal floods, abrasion and salt water intrusion and enhance the biodiversity of the region.

Currently, in partnership with IUCN Netherlands, Oxfam Novib and local partners, we work towards certification of sustainable shrimp farms in Indonesia.

Box 5 Commitments to protect mangroves in West Africa

As a result of three years work by Wetlands International and IUCN, six West African governments have signed the Mangrove Charter in 2010. This document commits Mauritania, The Gambia, Guinea Bissau, Senegal and Guinea to the protection of their mangroves. This Mangrove Charter also features country-specific Action Plans in which detailed activities are described to be undertaken by the same governments. Other West African may join later.

This breakthrough was a result from demonstration projects based on reforestation of degraded mangrove areas, best practice development for improved income for coastal communities and consultations for action plans for sustainable management.

Box 3



Box 4



Box 5



There is also lack of practical and tested tools for integrating mangrove restoration and conservation into a broader-scale of management and land use planning. In addition, trade-offs exist between on-site land users (who might benefit in the short term from mangrove conversion) and other stakeholders (who depend on the same mangroves for fisheries production and conservation).

Wetlands International works to increase coastal resilience

One of the core objectives of Wetlands International is to increase coastal resilience by maintaining or restoring the natural capital provided by coastal ecosystems such as mangrove forests. Our approach is to bring together science, policy and practice and to connect local, regional and global solutions. We collaborate with a range of partners that use, impact or depend on coastal wetlands, identifying practical solutions and facilitating collaboration.

We focus on:

- **Knowledge:** we broker knowledge and link it to practical know-how and policies
 - Together with research institutes, engineers and other NGOs, we conduct targeted research to develop best practice on mangrove management. We focus on coastal protection, maintenance of fish and carbon stocks, the economic reasons for mangrove maintenance and we facilitate the monitoring

of waterbird species. We use our evidence base to advocate for mangrove management that enables their wise use and their legal protection where needed.

- We work closely with humanitarian and development organisations that work on disaster risk reduction and climate change adaptation. Our aim is to highlight and integrate the role of healthy coastal wetlands to mitigate water-related extremes and hence reduce the risk of disasters.

- **Community-based mangrove restoration:** We support local communities to restore mangrove forests (see box 1 and 2), using innovative incentive-based approaches. We cannot restore the world's degrading mangrove coasts on our own but can leverage maximum impact by working through and with others. To do this we share the knowledge we have gained by providing technical advice and decision-making tools to our partners - governments, the private sector, communities and other NGOs.
- **Promoting innovative solutions and incentive schemes:**
 - We use the 'Bio-rights' microcredit scheme approach to enable communities to manage their mangroves sustainably (see box 1).
 - We explore and test the use of 'hybrid-engineering' measures for coastal protection (see box 3).



- We develop and advocate for incentives to create more sustainable aquaculture through the silvofisheries approach (see box 4).
- We assess the potential of mangroves to contribute to climate change mitigation and run pilot carbon projects.
- We address the values of mangroves with other stakeholders that (may) have an impact, like the oil industry in developing adequate oil-spill responses.

- **Advocacy:** We support the development of sustainable coastal resource management policies in key mangrove countries in Southeast Asia, West and East Africa and Latin America. For this we work closely with government agencies, private sector (including smallholders) and civil society. We advocate, for instance, for sustainable shrimp production (see box 4) and adequate oil-spill responses.

To date, some of our successes include:

- Wetlands International has **restored thousands of hectares of mangrove areas**, particularly in India near Chennai, in Indonesia (Sumatra and Java), Guinea Bissau and Sierra Leone. Following the 2004 tsunami in northern Sumatra, the Green Coast project was carried out in India, Sri Lanka, Thailand, Malaysia and Indonesia, which resulted in the rehabilitation of >2.000 ha of mangrove and beach forests in 70 project sites (see more results box 2).
- As a result of our work, The Indonesian Government has established **the Sembilang National Park** on the east coast of South

Sumatra, which safeguards the largest intact mangrove area of South-east Asia. The area is one of the most important staging areas for migratory birds of the East Asian-Australasian Flyway, supports large breeding colonies of herons, storks and ibises, and sustains an important coastal fisheries industry.

- A **Mangrove Charter** in West Africa: an agreement by six countries to conserve and restore their mangroves (see box 5), the adoption of the **Green Belt Policy** in Indonesia and a **Coastal Buffer Zone Policy** in Sri Lanka.
- In Guinea Conakry, Guinea Bissau and Sierra Leone, we provided **tools for solar salt production and improved fish smoking practices** to reduce the use of mangrove trees for firewood.
- In Indonesia we demonstrated how shrimp and fish can be **farmed more sustainably and efficiently linked with within a degree of mangrove restoration**.
- We identified, assessed and monitored mangroves and associated intertidal mudflats worldwide as areas of **international importance for migratory and resident waterbird species worldwide**. This contributed to their designation and management as Ramsar Sites and protected areas.
- We developed **management guidelines for mangroves** that benefit biodiversity, including for globally threatened Milky Stork *Mycteria cinerea* in South East Asia.

Some examples of our work:

Mangrove restoration through Bio-rights in Central Java, Indonesia

Bio-rights is an innovative financial mechanism that addresses environmental degradation by actively involving local communities in the conservation and restoration of the natural environment. In return communities are provided with (convertible) loans for sustainable development.

From 1998-2005, Wetlands International implemented its first ever bio-rights initiative through a mangrove restoration programme in the coastal area of Pemalang district, Central Java (Indonesia). The main goal of this activity was to restore biodiversity and the ecological functioning of mangroves as well as to improve livelihoods through developing a sustainable fisheries system for poor coastal communities. The main accomplishments were (i) creation of a mangrove belt and re-greening of existing fishponds on 50 ha of community land, leading to the revival of mangrove-related biodiversity and functioning, (ii) a threefold increase in the incomes of approximately 200 people as a result of sustainable development activities and the restoration of mangroves and the goods and services they provide, (iii) a significant decrease in vulnerability to erosion and storm damage, and (iv) replication of replanting activities elsewhere, without external incentives.

Integrating wetland conservation and restoration in disaster risk reduction

Following the 2004 tsunami in northern Sumatra, Wetlands International, with the support of Oxfam Novib, led a partnership initiative called Green Coast with IUCN, WWF and Both ENDS and their local partners to restore the damaged coastal ecosystems and rehabilitate people's livelihoods.

The main objective was community-based ecological restoration of tsunami-impacted areas and to improve people's livelihoods through a micro-credit system. The project was carried out in India, Sri Lanka, Thailand, Malaysia and Indonesia. The main accomplishments were rehabilitation of >2.000 ha of mangrove and beach forests in 70 project sites, direct support to sustainable development activities for 12.000 people, and improved livelihoods resulting from improved ecosystem conditions of over 91.000 people. Policy and advocacy activities led amongst others to the adoption of a coastal 'Green Belt policy' by Indonesia government and a coastal 'buffer zone' policy in Sri Lanka.

This successful post-disaster environmental programme and partnership got the interest of humanitarian organisations such as the Red Cross which are working on disaster risk reduction strategies and aim to strengthen the resilience of vulnerable communities. In 2011 an alliance consisting of Wetlands International, Red Cross, CARE, Cordaid and Red Cross Climate Centre was established. The key challenge of this alliance is to identify how environmental aspects and ecosystem approaches can be included in disaster risk reduction strategies. We currently run a 5- year programme to strengthen community resilience in 9 countries.

