Nairobi work programme on impacts, vulnerability and adaptation to climate change (SBSTA)
Submission under the area of adaptation planning and practices by Wetlands International

Submission on the Green Coast Project on restoring mangrove forests: an effective climate change adaptation approach

The global NGO Wetlands International conducted between August 2005 and June 2009 a major coastal resilience project in Aceh; the Green Coast project (see www.greencoasts.org).

Together with its partners WWF, IUCN and Both ENDS, Wetlands International developed a program to restore the damaged coastal ecosystems such as mangroves, beach forest, coral reef and sand dunes in the tsunami hit areas in Indonesia, Sri Lanka, India, Thailand and Malaysia.

Mangroves and climate change adaptation
The Intergovernmental Panel on Climate Change (IPCC) predicts that towards the end of the 21st century projected sea-level rise will affect large populations along coast lines. Coastal forests reduce the strength of waves and floods, thus protecting the villages in the hinterland. Especially in these tropical areas like in Southeast Asia with warm sea water, the IPCC expects more intense and more frequent storms.

At the site Aceh in Indonesia, like in many other countries, large areas of mangrove forests have been degraded or lost due to the establishment of shrimp farms, infrastructure and other development projects.
In the face of extreme storms and floods, the impact of this destruction is evident, as was dramatically shown when the December 2004 tsunami hit the coasts in Aceh. Areas where forests were lost suffered considerably more compared to areas that were sheltered by mangrove forests. In addition, mangrove forests provide many livelihood opportunities to people, like increased fish stocks and fire wood. This makes communities economical resilient.

Description of the project
The Green Coast project worked though a three pronged approach

- Science- and community-based assessments identifying ecological damage and priority options for coastal restoration
- Community-based restoration of coastal ecosystems (mainly mangrove forests) and livelihoods. For community involvement, we applied the 'bio-rights' finance mechanism (community groups receive financial capital to rebuild their livelihoods and, in return, provide environmental services to the coastal restoration work)
- Policy guidance and targeted communications aimed towards 'green reconstruction', to influence coastal resource management policies of district and national governments and to increase general awareness on value of coastal ecosystems

Best practices: an effective climate change adaptation approach
Being a well-tested approach in relation to climate change adaptation, the Green Coast model is also being promoted and implemented by Wetlands International to restore mangroves along highly vulnerable tropical coastlines, for example in West Africa.

Working through partnerships: Wetlands International led a consortium of partners (including WWF) to restore the coastal and mangrove forests. The consortium worked with local NGOs and community based organisations in the Aceh coastal area who worked with the local communities. A total of 76 restoration projects were implemented and 10 demonstration sites established. Local communities were trained in the technical aspects of mangrove restoration and maintenance and were also educated on the socio-economic values of these ecosystems.

Innovative finance mechanisms: Through an innovative finance mechanism, the communities received micro-credits in return for replanting and long term maintenance of the restored mangroves. This resultedin improved income and high survival rates of the replanted mangroves (> 80%). At provincial and local policy levels, endorsement was sought for the protection of these restored coastal ecosystems and mangrove forests.

Public engagement on laws and regulations: Realizing that a good policy should be accepted by and able to accommodate the need of the public, a two level approach was conducted in developing the policy analysis. This approach aimed at the existing regulation (official government regulations and customary laws) pre and after tsunami. It was viewed important to take up the customary laws (The Traditional Sea Customary Law-Hukom Adat Laot) as its apart of the local wisdom which has been passed on over centuries and still implemented amongst the coastal community, especially fisherpeople.

Cost and Effectiveness
The total costs of the Green Coast project amounted to one point five million million Euro, provided by Oxfam-Novib (Netherlands). The project has been successfully implemented in tsunami affected coastal areas in Aceh, Indonesia, Sri Lanka, South India, South-Thailand and Malaysia. A total of 91,000 tsunami affected people in these coastal areas have benefited from rehabilitated coastal ecosystems; more than 1,100 hectares of mangrove and coastal forests, 2,5 km of sand dunes and 100 hectare of damaged coral reef & sea grass beds were restored and protected.

Evaluation of the project results and outcomes show that an additional 12,000 people benefit from increased income from livelihood activities supported by Green Coast such as fishing, small scale aquaculture, eco-enterprises, home gardening and livestock.

In total approximately 2 million trees were planted restoring an area of 880 hectares. 9,000 people benefited directly from the micro-credits provided to start a small scale business. More than 45,000 people living in and behind the reforested area also benefit from increased coastal protection from the mangrove buffer zone and improved ecosystem services. Already, fish stocks increased considerably in the nearby areas.

Gaps and Needs
Wide recognition among policymakers and communities about the role of these Green Belts towards increased resilience and increased fish production was achieved, making the project very sustainable. However, the seventy six Green Coast sites in Aceh strongly need endorsement and protection from the Government which is still not guaranteed. Also, as the project can only work on a relatively small scale we as Green Coast partner still require further positive engagement with the Aceh and other governments from tropical coastal countries to engage in this community-based restoration approach.

Lessons learned
Our experiences have showed that public acceptance plays a key role in policy implementation. The involvement of media as well as designing approaches involving the government, local NGOs as well as local communities is critical. Most importantly, though the project illustrated the importance of understanding of ecosystem based approaches and the inclusion of these approaches on local, provincial and national level adaptation policy development and implementation.

About Wetlands International

Wetlands International's mission is "to sustain and restore wetlands, their resources and biodiversity for future generations". The mission is the 'umbrella' for our activities. Under this umbrella we work on the following themes amongst others:

- **Livelihoods:** we help people to conserve and restore wetlands for the services they provide - such as drinking water, fish, reeds for building material etc. and advise local organisations and governments on these services and wetland biodiversity ensuring their wise use.
- **Climate change adaptation:** Wetlands International has a long standing
- history in investigating the role of wetlands in relation to, among others, the provision and regulation of water supplies, flood prevention, increasing coastal resilience and is working to support the incorporation of wetlands functions and benefits into adaptation policies and plans.
- **Water management:** we investigate the role of wetlands in water management, such as their water purification function and in mitigating floods and droughts. We advise governments on how to integrate wetland management into water resource management programmes at the catchment or basin scale.

Building on many years of work, we underline the role that wetlands can play to attenuate the impacts of climate change. Marshes and lakes for example store more water than any other fresh-water ecosystem. These areas are increasingly crucial to store excessive water caused by less predictable and more extreme precipitation and by glacial melt. Coastal wetlands such as mangrove forests show a high potential to reduce the impacts of waves and storms and to cope to some extent with sea level rise by accumulating silt and reducing erosion.