



Livelihoods in Focus: Tidal wave-blocking mangroves save coastal communities in the Sundarbans, India March 2014

Introduction

The Sundarbans are a group of 102 islands located in the State of West Bengal in eastern India in the Ganges Delta, stretching into southern Bangladesh. They form the largest estuarine mangrove forest in the world.

Type of Project: Mangrove restoration
Location: Sundarbans, India
Start Date of Project: 2011
Local Partner: Nature Environment and Wildlife Society (NEWS)
Number of People Impacted: 250 000

Like many mangrove areas, these coastal forests provide vital protection for millions of people from climate change impacts, cyclones, tidal surges, and coastal erosion. The communities of the Sundarbans protect their agricultural lands and their homes by building and maintaining dams and levees (raised embankments) that need regular maintenance. There are 3,500 km of embankments on the 54 inhabited Sundarban islands. Reinforced by clay brick produced in coal-burning factories, these structures are a major source of carbon emissions.

To supplement the work of reinforcing the raised embankments, Livelihoods and Nature Environment and Wildlife Society (NEWS) are empowering villagers to replant

mangroves, which will also provide a nursery and feeding ground for fish and thus, food for the local community. Since 2008, NEWS has helped the people of Sundarbans to build natural barriers of mangroves to protect their embankments. 5 500 hectares are currently being planted. Ninety eight village sites are included in the 9 630 km² Sundarban Biosphere Reserve, and the project locations cover the estuaries of River Ganges at 5 different zones: Bidya, Raimangal, Matla, Saptamukhani, and Sagar. Adding mangroves as biological defence to the islands will help to reduce the breaching of the raised embankments and protect farmland, homes, and livelihoods.

Sustainable development and social impact: benefits

NEWS and Livelihoods are working together in the Sundarbans to engage marginalized communities in a participatory approach to enhance local livelihoods and promote the use of natural ecosystems in disaster risk reduction by planting mangroves as natural infrastructure to strengthen the embankments. The project also aims to restore the biodiversity of the coastal wetland ecosystem and implement wise and sustainable practices to improve livelihoods and empower women, reduce climate change impacts and coastal erosion, protect crops and homes, and reduce carbon emissions.

Improved livelihoods and the empowerment of women in the communities are a direct benefit of this project. NEWS is training local women in the process of establishing and maintaining a mangrove nursery, planting the young mangrove trees and managing them in the field. This work will help to impart knowledge and skills, raise the role of the women in a socially valuable programme and empowers them with a sense of pride and security that they are a part of a socially and environmentally relevant project.

Restored mangrove ecosystems, acting as a nursery and feeding ground for fish, molluscs and crustaceans, will provide economic and nutritional value to the community members. Mangrove forests, when healthy, are the basis of a complex marine food chain, and naturally filter and clean the water and remove pollutants from water from upstream and help to improve water quality.

Reducing carbon emissions by using the natural carbon capture abilities of the mangroves will take time, but the benefits are tremendous. Mangrove forests capture carbon very effectively, in part because of the fixation



of carbon in the mud. The new mangrove trees scheduled to be planted over 5 500 hectares by Livelihoods and NEWS will result in 0.7 million TeqCO₂ over 20 years. This not only translates into carbon credits for investors in the Livelihoods Fund, but also into a healthier ecosystem that upgrades the livelihoods of the local communities by decreasing poverty, food insecurity and forced migration due to climate change impacts.

Fighting the climate change impact of rising sea levels

Rising sea levels are a consequence of global climate change directly affecting the Sundarbans and its communities. As the sea level rises, and the man-made barriers and levees fail to prevent inundation, valuable farmland is lost and the remaining land is affected by increased soil salinity, making it harder to reclaim such land for use in the future. Additionally, thousands of families in the Sundarbans would be rendered climate change refugees and would be forced to relocate when these islands become either temporarily or permanently submerged.¹

Reducing coastal erosion using mangroves as a bio-shield to adapt to sea level rise is thus a key benefit of this project. Mangroves, found on marine coasts, can help low-lying coasts adapt to rising sea levels and protect shorelines from erosion by increasing sedimentation due to the accretion of land trapped in the lateral branching system in the delta. Their roots, branches and trunks, which reach well above and below the ground and the water level, can indeed help lessen the impact of waves generated by storms. Mangrove forests thus help to reduce risks to people and their homes and farmlands from wave damage, flooding, tidal and storm surge. Mangroves can also help adaptation through an increase in soil surface elevation or by colonising more landward areas, as shown by recent research.² A study completed in the aftermath of the 2004 tsunami of Aceh, Indonesia, which killed 220,000 people living on the coasts of the Indian Ocean, cited models showing that 30 coastal trees per 100 square meters could reduce the flow of a tsunami by 90 percent, according to a 2005 report in the journal Science.³

The role of conservation, sustainable management of wetlands, and enhancement of carbon stocks in developing countries can help Ramsar and its partners to achieve climate change adaptation and mitigation objectives. The Ramsar Convention work on climate change, noting the Verified Carbon Standard, has stated, "VCS Agriculture, Forestry and Other Land Use (AFOLU) programme for crediting climate benefits from all wetland areas, including mangroves, freshwater tidal coastal wetlands, salt marshes, sea grasses, floodplains, peatlands," and is recognized in the Ramsar Convention COP11 Resolution on Climate Change. This resolution supports the creation of opportunities for adaptation to climate change, wetland restoration as a tool for climate responses, and the role and importance of different wetland types in the global carbon cycle.⁴

The Livelihoods-NEWS project of reforestation and afforestation of mangroves in the Sundarbans will:

- Regenerate the degraded biodiversity resources of the wetland ecosystem in the Sundarbans,
- Create a biological defence against natural calamities and protect the embankments,
- Increase the safety of local coastal communities,
- Ensure continued existence of the community in this vulnerable ecosystem through increased access to wetland resources, and reduced risk to the loss of livelihoods
- Involve women in the plantation programme to enhance their financial status and social security, and
- Reduce the area's carbon footprint and obtain carbon credits by restoring the protective shield of mangroves.

¹ WWF-India, "Sundarbans: Future Imperfect, Climate Adaptation Report" 2010.

² McIvor, A.L., Spencer, T., Möller, I. and Spalding, M. "The response of mangrove soil surface elevation to sea level rise." 2013.

³ Chatterjee, Neil, "Tsunami-Blocking Mangroves Lure Carbon Investors: Southeast Asia," Bloomberg, 2013:

<http://www.bloomberg.com/news/2013-11-19/tsunami-blocking-mangroves-lure-carbon-investors-southeast-asia.html>

⁴ Ramsar Convention COP11 Resolution on Climate Change: <http://www.ramsar.org/pdf/cop11/res/cop11-res14-e.pdf>



Additional information

- NEWS website: http://www.naturewildlife.org/activity-details.php?project_id=10
 - NEWS Video: <http://www.youtube.com/watch?v=gn5VfNIgQtA>
 - Livelihoods Fund <http://www.livelihoods.eu>
 - VCS: Verified Carbon Standard (VCS) programme for crediting climate benefits and methodologies used for Livelihoods projects: <http://www.v-c-s.org/>
 - WWF-India, "Sundarbans: Future Imperfect, Climate Adaptation Report" 2010 http://awsassets.wwfindia.org/downloads/sundarbans_future_imperfect_climate_adaptation_report_1.pdf
 - McIvor, A.L., Spencer, T., Möller, I. and Spalding, M. (2013) The response of mangrove soil surface elevation to sea level rise. Natural Coastal Protection Series: Report 3. Cambridge Coastal Research Unit Working Paper 42. Published by The Nature Conservancy and Wetlands International. <http://coastalresilience.org/science/mangroves/surface-elevation-and-sea-level-rise>
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About this series

As part of the ongoing partnership between the Ramsar Convention Secretariat and Livelihoods Fund, this article is part two of a four-part series looking in-depth at connections between our areas of work. Each story will showcase how both organizations are promoting habitat conservation (especially wetland habitats) by encouraging sustainable, wise-use practices, and addressing issues of climate change. The Livelihoods Fund is a unique carbon investment fund that finances major projects in reforestation, sustainable farming and efficient energy in developing countries in Africa, Asia and Latin America. Its mission is to improve the living conditions of rural local communities through the restoration of their natural ecosystems, which serve as the core of their livelihoods and is directly linked to their food security. All projects are carried out by and for the benefit of the local communities in tandem with a local partner NGO. Livelihoods' investors are private companies committed to combating climate change by their reducing carbon emissions via voluntary offsets that they receive from the projects. The Ramsar Convention Secretariat works with Ramsar Convention Contracting Parties to encourage wise use, international cooperation, and designation on Wetlands of International Importance, called Ramsar Sites.