

Knowing what happened, knowing what needs to be done

Since last December, many assessments have been conducted around Sri Lanka to determine post-tsunami impacts. Assessments in Sri Lanka under the Green Coast project are concentrating on gathering information to guide coastal rehabilitation.

The project focuses not only on communities, but also on the coastal ecosystems and integrated livelihood restoration, including mangroves, sand dunes, coral reefs and their uses.

Wetlands

The coastal regions of Sri Lanka are home to wide, beautiful sandy beaches, diverse coral reefs, rich mangrove swamps and natural sand dunes. It also hosts three Ramsar Sites, wetlands of international importance for the protection of birds. These wetlands are home to many migratory species of birds and to turtle nesting sites along the coastal habitats of Sri Lanka.

Rapid assessments

In the immediate aftermath of the tsunami, IUCN SL conducted rapid assessments along the south and east coasts of Sri Lanka to determine environmental impacts. Key findings included the significant defensive role played by natural barriers such as mature sand dunes and wide stretches of mangroves. Another conclusion was the importance of integrating environmental factors into development activities.

National Parks

During the following months, several more assessments were conducted. These included coral reef assessments and reef clean-ups with documented results. In addition assessments were carried out in some of the National Parks of Sri Lanka which were affected by the tsunami. All assessment reports are available at www.iucnsl.org

Further assessments

Further assessments are being conducted under the Green Coast project in the following areas: Hikkaduwa to Unawatuna, Rekawa to Godawaya, Pallemalala to Kirinda, Arugambay to Thirukkivil, Akkarapattu to Kalmunai and Kalmunai to Baticoloo.

Extent of damage

These assessments are designed to gather data on the extent and type of damage that has occurred, its consequences for local communities and the specifics of each site. Specifics that include both cultural and environmental concerns.

Gender equity

The assessments are to centre on local community participation and gender equity, two important aspects of the Green Coast Project. Local NGOs and CBOs are a critical part of the assessments being carried out. Many of the field assessments are being done with the assistance of these local organisations. In addition, gender sensitive rehabilitation is a key priority.

Greening the coastline

It is envisioned that the results of these assessments will feed into restoration planning and implementation. Furthermore they will assist in greening the coastline of Sri Lanka - restoring livelihoods through the conservation of ecosystems.

Hikkaduwa to Unawatuna

This coastline has been highly modified by human activities over a long period of time and in most areas natural vegetation is non-existent. When the tsunami wave struck the land, human infrastructure (houses, hotels, guest houses) took the direct impact. Coast protection structures were destroyed, roads damaged and canals were blocked

Impacts to Natural Environment The mangroves and the adjoining marshland have been inundated by the tsunami wave and survey team documented several areas where the mangroves has been fallen or uprooted. Furthermore the wave has been funnelled along the river, and has uprooted and damaged the bank vegetation, which was a mix of mangroves and mangrove associates (Rhyzophora, Sonneratia, Cerbera). In Maha modara and Dodanduwa estuaries, seashore vegetation has been affected and the beach erosion can be seen. Dodanduwa estuary and the adjoining Rathgama Lake have been inundated by the wave that was funnelled along the Dodanduwa ela. The fallen and uprooted mangroves and other lake front trees are scattered over seaward side of the lake. The sub tidal habitats with beach bolder rocks near the Lighthouse hotel and Rathgama were also assessed, as they are important coastal habitats. The survey findings suggest that the impacts were minimal, as no significant physical damage to the structures was noted. The rubble and sediments that came with the wave have been cleared away by the continuous wave action. Impacts to Livelihoods There were several fisheries harbours in Hikkaduwa, Galle and Dodanduwa all of them were badly damaged from the tsunami. The infrastructure facilities including buildings for storing fishing gear and boats have been damaged. Due to the erosion of the beach small scale fishermen have also affected, as they use the beach for anchorage. The small-scale cottage tourism is another important livelihood for the communities living along the coastline of this stretch. This industry was badly affected by the infrastructure damage to the homes and small businesses.

Rekawa to Godawaya

This stretch is characterised by the presence of variety of natural coastal habitats/vegetation types and man made habitats. The sandy beaches of Rekawa, Godawaya are important as turtle nesting sites. These habitats and the coastal lagoons are also very important for nature-based tourism. The coastal lagoons are very important habitats for migratory birds

Impacts to Natural Environment Mangrove vegetations on the seaward side of the Medilla estuary have been subjected to severe damage. In Rekawa, mangroves situated along the lagoon have not been damaged. In Wellaodae and Kapuhenwala mangrove vegetation has been subjected to severe damage. But, the mangrove stand located about 50m inland shows minimal damage as a result of being shielded by the mangroves closer to the sea. In Kunukalliya and Lunama lagoon, the woody vegetation on the landward side of the dune has subjected low levels of impact. The scrubland vegetations in Lunama situated close to the beach has severely damaged. The scrubland vegetation near the Ussangoda fishery harbour beach showed high level of erosion and woody plants have been subjected to high physical damage. The mixed mangrove systems situated in Wanduruppa area have been subjected to severe erosion of the land and the damage to the mangroves is also high. The seashore vegetation, which comprise of Spinifex and Ipomea have been severely affected in certain areas due to the extensive erosion caused by the tsunami wave. Furthermore, because of the increase in salinity in the soil, a significant number of home garden trees has died. Low-lying paddy field areas along the coast (eg. Walipatanwila) have been affected due to the intrusion of the seawater. Several nesting sites in Rekawa, Ussangoda and Godawaya areas have been destroyed. This included the in situ turtle nesting station in Rekawa. Impacts to Livelihoods The fishing communities along the coastline of this particular stretch have been affected by the tsunami, because damage to fishing gear, harbours and generally the infrastructure relating to the fishing industry. Tourism infra structure such as tourist hotels (eg: Medilla, Modaragama village at Wanduruppa) has been severely damaged. The paddy fields in walipatanwila have been destroyed by the intrusion of tsunami wave into the paddy lands. This has resulted in loss of income for the farmers. The houses in wanduruppa have been subjected significant damage.

Palle malala to Kirinda

This coastal stretch is characterised by the presence of high and broad sand dunes along the coastline of the Bundala National park. Furthermore three lagoons Malala, Ebillakala and Bundala lagoon systems are important landscape features. The sand dunes, its associated vegetation (runners and creeper plant communities, coastal

scrublands), rocky intertidal habitats and broad sandy beaches have been subjected various levels of erosion due to the tsunami wave

Impacts to Natural Environment The survey team found varying levels of erosion in the sand dune along the coastline. The sand dune and its associated floral communities, mainly runners, creepers and coastal scrublands have been affected at varying levels. Communities of *Ipomea pescapre* and *Spinifex littorina* have been badly affected by the tsunami wave and 75 % of their cover has been reduced at certain locations. Furthermore in certain location near the Kirindi Oya river mouth, the physical damage to the coastal scrublands is clearly evident. The survey team found significant impact to scrubland vegetation at this site. The erosion of the sandy beach has made a severe impact to the in situ turtle conservation site in Uraniya. According to the officials of the Department of Wildlife Conservation at least 75 nesting sites has been destroyed by the tsunami wave. The small mangrove patch belonging to the Bundala national park (0.5 ha) has been wiped out by the receding water from the bundala lagoon and the saltern. In Handagala, a large mangrove patch (at least 1 ha in extent) has been severely affected. The survey team found that more than 50 % of the trees are either leaning or have been uprooted. High amount of debris was found in the adjoining marshland. A canal that discharges water into the sea has been completely blocked. Sand bars that have formed across the lagoon mouths have been breached by the tsunami wave and it had penetrated deep into the lagoons. This lead to a salinity change in especially in Malala lagoon, where many freshwater fish species has been subjected to mass mortality. The tsunami wave has also lead to introduction Invasive Alien Species to new areas within the Bundala national park. Several clumps of invasive *Opuntia dillenii* have been washed from the coastal areas to new areas.

Impacts to Livelihoods The impacts to livelihoods were very apparent in Kirinda and Handagala sites, which is beyond the boundary of the Bundala National park. In these sites Houses, Guest houses and small businesses have been completely destroyed in most cases only the foundation remains. In Handagala, nearly 30 – 50 houses have been completely destroyed and several lives have been lost. Roads, water canal, bridge has been damaged. Fishing is the only permitted livelihood for the people in the areas falling within the bundala national park. Several small fishing camps and fish-landing site within the park limits (Uraniya, Pathiraja), were completely destroyed. Further to this, temporary fishing huts and anchorage areas for near shore fishing boats and canoes have also been destroyed.

Pottuvil to Tirrukkovil

This coastal stretch is similar to the area between Palle malala to Kirinda and is characterised by the presence of large coastal sand dunes. A network of lagoons, starting with the Pottuvil lagoon stretch northwards along the coastline extending into the Trincomalee district. Prominent sand bars have formed at lagoon mouths. Sand dunes and associated vegetation along with some lagoon associated vegetation such as mangroves have been affected by the tsunami wave

Impacts to the Natural Environment Damage to mangroves along this coastal stretch was not excessive, with the worst damage occurring within the Komari lagoon area. Other habitat types that were impacted by the tsunami waves include sand dunes, beach front vegetation and coconut plantations in areas such as the mouth of the Komari lagoon. Around the Arugam Bay and Komari Lagoon areas, the survey team observed sand deposition within the lagoon. This appears to have occurred in areas where sand dunes have been damaged by the force of the tsunami wave. The damage to the Arugam Bay area may have been enhanced by the sand mining activities that occur around the mouth of the lagoon. Such activities destroy the natural barriers present thereby making the inland sites more vulnerable to natural disasters. The most prominent feature of the Thirukkovil lagoon, the sand bar, appears to have been slightly damaged by the tsunami wave. However, this damage did not appear to have knock on effects on the livelihoods in the area. Pottuvil lagoon area appeared not to have been affected by the impact of the tsunami wave. This includes mangroves and the surrounding coconut plantations. This may be due to a variety of features such as distance from shore, wave angle land gradient. Relatively low human impacts on the vegetation of the area may have also created a more stable natural environment that is capable of withstanding the tsunami wave. In areas such as

those surrounding the Muhudhu Maha Viharaya, a Buddhist temple in Pottuvil, no damage to vegetation or habitats was observed. The large sand dune, which is approximately 0.75 km wide and 1 km long appears to have absorbed the energy of the tsunami wave and thereby protected the inland areas. The stability of the sand dune was probably increased in some areas by the scattered scrubland. Other impacts to the ecology of the area include new housing developments encroaching on the natural vegetation in places such as Thimbulu, Pottuvil and Thirikkovil lagoons. In Arugam Bay, it was also evident that hotels were encroaching on the wetland. Impacts to Livelihoods The impacts to livelihoods were particularly apparent around Komari lagoon, Thimbulu lagoon and Arugam Bay. At the latter, where tourism is a large industry, damage to infrastructure such as hotels and guesthouses was extensive. Fisheries harbours and landing sites along this stretch were also badly damaged by the tsunami and fishermen have lost boats and fishing gear. In many areas along this stretch, houses were also destroyed by the force of the tsunami wave.

Tirrukkovil to Kalmunai

This coastal stretch is characterised by the presence of variety of natural coastal habitats/vegetation types and manmade habitats. The lagoon systems in Rekawa, Kalametiya and Lunama, grasslands and scrublands in Ussangoda and Lunama, sand dunes in Lunama and Godawaya are significant for biodiversity and livelihoods. Furthermore Godawaya and Ussangoda are important sites of archaeological importance. The sandy beaches of Rekawa, Godawaya are important as turtle nesting sites. These habitats and the coastal lagoons are also very important for nature-based tourism. The coastal lagoons are very important habitats for migratory birds

Impacts to the Natural Environment Along this stretch, the mangroves and homesteads were badly damaged. In addition, the sand bar (comprising approximately 5% of the area) located adjacent to Periya Kalapuwa was practically destroyed. Some true mangrove species (approximately 5%) were found to be scattered throughout the mouth of the lagoon. Due to the heavy destruction of mangrove species in this area, both due to the tsunami and human impacts, it is a potential location at which to promote mangrove replanting. Impacts to Livelihoods Apart from one fish-landing site located close to the mouth of the Periya Kalapuwa, most of the others were badly damaged by the force of the tsunami wave. Although human settlement around the lagoon was low, evidence of destruction was extensive. Housing was observed to be more extensive further away from the lagoon area. Despite the immense damage this stretch has been succumbed to, the re-development of a cashew plantation covering an area of 2 x 0.25km of the sandy beach is a positive sign of rehabilitation in the area.