DHI CASE STORY

PROTECTING THE COAST OF GUYANA FROM COASTAL FLOODING

Preventing the loss of vital mangrove forests

Located in the Caribbean, much of Guyana's population lives below sea level. With climate change causing higher sea water levels, the country has been facing increasingly frequent coastal flooding events. We developed an integrated management system to help Guyana combat the flooding using mangroves. In so doing, we enabled Guyana to protect its coast, businesses and citizens more effectively.

RESTORING GUYANA'S COASTAL DEFENCES

Around 90% of Guyana's population lives in an area that is below sea level, with many inhabiting flood-prone areas along the coast. The coastal plains are also home to about 75% of the country's economic activities, including almost all of Guyana's agricultural production. Mangroves protect about 60% of the Guyanese coast from floods, thereby playing a vital role in defending the people and businesses from rising sea levels.

Over the years however, degradation and loss of mangrove forests has resulted in increased coastal flooding and salt water inundation of agricultural land. The salt water inundation could also contaminate Guyana's freshwater supplies, in addition to have a devastating effect on the country's agriculture industry. To prevent this, the government has invested heavily in cost-intensive artificial sea defences.

Aerial photo of restored section of mangroves

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SUMMARY

CLIENT

Government of Guyana and the European Union (EU)

CHALLENGE

- Degradation and loss of mangrove forests resulting in coastal flooding
- Inundation of agricultural land by salt water

SOLUTION

Using our project management experience and expertise in mangrove ecology, restoration and monitoring to improve mangrove conservation methods

VALUE

Re-establishment of mangroves along coast of Guyana, leading to improved flood protection

LOCATION / COUNTRY

Guyana

Under the EU's Global Climate Change Alliance (GCCA), the Guyana Mangrove Restoration Project (GMRP) supports Guyana's policies on sea defence, climate change and mangrove management. As sea levels continue to rise, the GMRP is examining ways to shield its people and economy and improve flood protection using mangroves.

To assist with this, we seconded one of our experts to help the GMRP address the loss and degradation of mangrove forests. He served as team leader and mangrove specialist, developing an integrated management system to help the Government of Guyana:

- understand what causes the loss of mangroves in the country
- develop a suite of appropriate solutions such as mangrove protection, community interventions, mangrove restoration and coastal engineering
- develop a comprehensive monitoring system to examine the performance of selected interventions

With the National Agriculture Research and Extension Institute (NAREI) – under Guyana's Ministry of Agriculture – we consulted with stakeholders to agree on priorities in terms of technical assistance for the project. We then worked with GMRP staff to implement project activities.

Waves breaking on unprotected section of seawall

IMPROVING MANGROVE PROTECTION

Over the course of the project, we conducted a detailed review of the GMRP's mangrove restoration efforts. We completed an inventory of mangrove species and the distribution of Guyana's coastal mangrove ecosystem. We also analysed the mangrove protection and restoration methods, survival rates and sustainability. In addition, we conducted an assessment of the impacts of illegal logging, grazing and infrastructure development on the coastal and estuarine mangrove areas of Guyana.

Based on this information, we helped the GMRP develop and implement a new strategy for rehabilitating mangroves. Previously, Guyana built artificial sea walls to protect the coast. These can be very costly to construct and maintain. As such, we suggested measures designed to increase the recovery of the mangroves along the Guyanese coast, including:

- introducing alternative restoration methodologies, such as planting coastal grass species
- constructing fences to control grazing
- hydrologic restoration

This would ensure the protection and conservation of the mangroves, providing protection for the coast in less time and at a lower cost than sea walls.

We also assisted with the development of a GIS-based monitoring and mapping system. To achieve a harmonised monitoring system for the coastal zone, we also helped integrate the mangrove monitoring with:

- sea defence monitoring
- monitoring, reporting and verification of forests under Reduced Emissions from Forest Deforestation and Degradation (REDD+) scheme. REDD+ allows countries to generate carbon credits from forest areas that are protected from degradation or cutting.

We also conducted a biodiversity assessment of mangrove sites. This can be used as a baseline for future assessments and as the basis for future management plans for these areas.

Fish caught from mangrove areas

BUILDING REGIONAL CAPACITY

The NAREI wanted to foster local and regional capacity building in the field of mangrove management through a yearly forum. We assisted this effort by helping to organise a regional Scientific Forum on the Mangrove Ecosystem.

Attendees from ten countries shared their experiences, approaches to mangrove management and lessons learnt from their projects. The forum was well received by participants, who expressed their desire to form a regional mangrove alliance. This would encourage information sharing and cooperation between the people and organisations working on mangrove issues in the Caribbean region.

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