

## Conclusions - Indonesia, Seychelles and Sri Lanka

Although all quite different in nature, Indonesia, Seychelles and Sri Lanka represent typical examples of island states, all three being vulnerable to the effects of storm surges and tsunamis. The latter is certainly true for Indonesia being situated in a particularly active earthquake zone. However, recent events have also shown the vulnerability of more remote areas such as the Seychelles. The three island states, each in their own way, have taken steps to reduce their vulnerability to these damaging events.

### **Sustainable, post tsunami restoration in Indonesia**

Triggered by the big tsunami at the end of 2004, Indonesia has taken steps to improve their system for sea defence, involving the development of flood protection measures; construction of multifunctional refuges; and regional early warning (linked to a national early warning system). The improvements for flood protection include design guidelines for sea defence and urban drainage measures, including dikes, drainage channels, outfall structures, seawalls, breakwaters, sand nourishment and the 'regreening' of coastal areas. Other improvements relate to the use of integrated spatial planning and zoning principles (based on flood hazard maps from tsunami flood modelling), evacuation routes, training and awareness building.

### **Seychelles: tsunami mitigation by nature conservation**

The Republic of Seychelles is a vast archipelago in the western Indian Ocean, including 115 small islands with less than 500 km<sup>2</sup> within a sea area of more than a 1 million km<sup>2</sup>. Some 40 islands are granitic. The others are low-lying coral islands. The number of inhabitants is less than 90,000. Most people live on the 3 largest granitic islands (Mahé, Praslin and La Digue). The main islands are protected by distinctive vegetation zones from the mountain ranges to the beaches. Coastal vegetation is important for coastal protection. Mangrove belts in particular are also multifunctional and valuable ecosystems.

The Seychelles have been able to protect and maintain their valuable vegetation belts because of effective and enforced legislation, capable institutions and public awareness. The 2004 Tsunami hit the island with 4 metre waves causing only very limited damage. The Seychelles will be vulnerable to storm surges aggravated by the effects of sea level rise and particular the southern islands, may become more effected by tropical cyclones, as temperature increases.

The continuation of the present spatial planning and vegetation protection policies provide a solid basis to help cope with the problems that lie ahead. The Seychelles provide an excellent example of the great benefits derived from their integrated spatial planning approach and nature conservation, its successful implementation and enforcement. Efficient nature conservation management results in effective protection against erosion and flooding, and appreciation by tourists contributing for about half to the GDP of the Seychelles.

### **Sri Lanka: the ICZM cradle in Asia**

Sri Lanka has a high population density particularly in its coastal zone. There is also a large variation in coastal areas, which suffer from a variety of coastal problems. The country has a long history of coastal zone management, with ICZM programme development beginning in the 1970s. The first focus was on solving coastal erosion problems. Later on, attention was broadened to include degradation of habitats such as valuable coral reefs and mangroves, water quality issues and sustainable development of fisheries and aquaculture. Developments of the ICZM approach went hand in hand with institutional developments. In addition to these top down planning and institutional developments, special area management (SAM) planning provided a greater involvement of stakeholders and local administration. The range of activities has produced successful examples of improvements for example promotion of ecotourism, the establishment of marine reserves and enhancement of shrimp production by improving water quality and restoring larvae exchanges between the coastal and lagoon waters. However, the experiences in ICZM implementation have also shown severe limitations, for instance in the knowledge base, and weaknesses in the power and mandates of coastal authorities and in the underlying legislation. The experiences in Sri Lanka show that the establishment and implementation of ICZM can be seen as a series of battles, which are not always victorious.