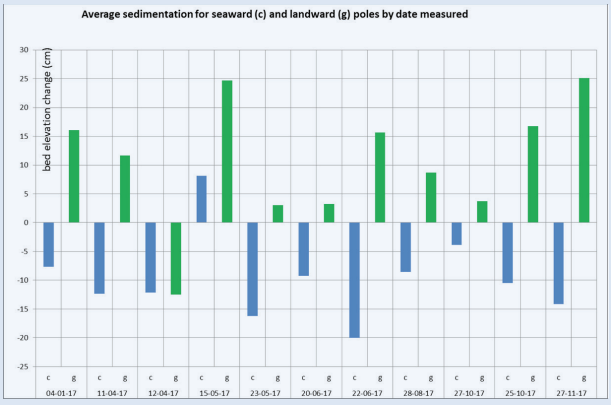
ECOSYSTEM-BASED ADAPTATION USING BUILDING WITH NATURE: TOWARDS RESILIENT COASTS IN INDONESIA

The coastlines of Northern Java are faced with rapid population rise, as well as extensive industrial and agricultural developments. Their geological composition, with hundreds of metres of thick alluvial clay deposits, and their low elevation make them extremely vulnerable to anthropogenic and environmental pressures. Land subsidence and sea level rise are resulting in recurring floods and massive coastal erosion, severely hampering economic development due to blocked transportation routes, the loss of land for agriculture and aquaculture, and the costs for continuous repairs of public and private infrastructure.

The construction of hard infrastructure is the most widely accepted approach to reducing erosion and limiting floods. However, this is not a feasible protection strategy for the whole of coastal Java: these measures are expensive, they focus on single-purpose solutions and they require continuous and costly maintenance, especially on soft muddy soils. Building with Nature is therefore exploring innovative techniques that aim to halt erosion and restore sedimentation processes in the intertidal area by building permeable bamboo and brushwood dams. The new land created with this approach will be conserved as a mangrove greenbelt that protects earthen seawalls and the hinterland from wave impact but also acts as an indispensable nursery for fish, shellfish and shrimps.

The work was funded by the Dutch and the German governments through the Sustainable Water Fund (SWF) programme and the International Climate Initiative (IKI), and it was executed in a consortium with Dutch NGOs and engineering firms and in collaboration with several Indonesian governmental bodies at the regional and national levels.



Average sedimentation in front of (c) and behind (g) the permeable structures

The project has booked several results. First, permeable structures made of local materials have been designed, build, maintained and, finally, optimised. These structures have already been successful on the coast of North Java, where they have been used to accumulate fine sediments, locally reversing coastal erosion. Our monitoring plan, and the associated monitoring data and reports, have confirmed the success of the permeable structures. Secondly, a training programme has been developed and executed as part of this project, reaching local governmental agents, coastal managers at different regional levels and local trainers such as universities and research institutes. The training programme is still ongoing and it primarily addresses Building with Nature solutions. Third, and most recently, a study of the catchment area of the study site has been conducted that shows the freshwater seasonal dynamics and delivers the knowledge needed for sustainable freshwater management in the area. A summary has been provided in a report. It is important to note that the sustainable use of freshwater resources is key to maintaining a healthy mangrove forest and productive aquaculture ponds in the coastal zone.

Contact
Miguel de Lucas Pardo, Miguel.deLucasPardo@deltares.nl,
t +31 (0)6 1582 1880

▼ *Overview of some of the permeable structures built on the coast to accumulate sediment*