



Problem: the north coast of Java (Indonesia) is suffering from massive coastal erosion and flooding caused by mangrove deforestation, unsustainable aquaculture and groundwater abstraction.



TO2 Solution: Wageningen Marine Research and Deltares have partnered in an innovative coastal recovery project that works with 'soft' small-scale structural interventions (permeable dams) that restore mangroves. These have been copied from the ancient Dutch technique of breaking the wave motion of the Wadden Sea. This prevents flooding and coastal erosion. The mangroves are returning and the cultivation of shrimp is possible again.



Impact: it leads to recovery of the ecological and economic resilience of 20 kilometres of coastal area, which can be expanded with local resources and can potentially better protect 30 million people from floods. Erosion will be stopped and coastal communities will gain new economic prospects with the renewable cultivation of shrimp and fish.



WUR,
Deltares

Nature is glad to help

Once, island dwellers placed dams made of poles and branches in the Wadden Sea to break the wave motion. Nowadays, jointly with Deltares and business partners, scientists at Wageningen are applying this ancient technique for recovery of the mangroves on Java (Indonesia). A matter of building with nature, which prevents the coastline from disappearing.

According to Dolfi Debrot, Senior Researcher at Wageningen Marine Research, there are various reasons for the massive coastal erosion in North Java. One of them was shrimp cultivation, for which the population cut down mangrove forests and excavated pools, causing the country to continue to subside. But groundwater extraction also caused more than three kilometres of coastline to disappear. It made the area even more vulnerable to stormy weather and rising sea levels and caused a decline in fish stocks.

Nature's resilience

In 2015, a consortium of water experts and knowledge institutes launched a programme for mangrove recovery on North Java. Along the coast, permeable wooden dams, each of a hundred metres in length were constructed to retain

the sludge, which raised the soil level and allowed the mangroves to grow. Dolfi Debrot, who undertakes similar projects in the Antilles and in Bangladesh, is always so surprised by nature's resilience. "You help a little by placing dams and protecting the mangroves from waves, and nature takes over. Aside from a few exceptions, it is not necessary to plant trees, the seeds floating about germinate by themselves."

Marker Wadden

The project is a fine example of building with nature, a concept in which nature reduces the risks of climate change, such as wave motion and sea-level rise. Among other things, the Netherlands applies it to the shoreline zones of Marker Wadden. Nature development islands of sand, clay and sludge are constructed in such a way that sufficient food is available for birds. On Java, too, fish stocks quickly recovered, allowing the local population to regain their livelihood. There is a new experiment with dams made of less perishable, local bamboo poles. These

are easier to maintain than branches and can serve as a base for mussel cultivation. "The income gives the population an extra incentive to maintain these small dam walls." This pilot scheme can be applied across the North Javanese coast by the local population using local raw materials. ■

Who: a consortium of water experts and knowledge institutes (WUR, TU Delft, Deltares, EcoShape, Wetlands International) and local public authorities.

Duration: 2015-2021.

Budget: €5 million, of which more than half has been contributed by the parties involved.

Follow-up: as from September 2020, three NWO researchers will start cultivating green mussels. This is done on dams made of less perishable bamboo poles.