

# Nature's technology

The delta regions of the world need new solutions to help prevent flooding and drought. Natural climate buffers are a cheaper option than 'hard engineering'. Interest in 'nature's technology' is growing in many delta areas, including those in Vietnam, China and the Netherlands.

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A quiet revolution is going on in the land of Hans Brinker. You may recall the old tale about Brinker, the Dutch boy who stuck his finger in the dike and saved his countrymen from a flood. The little lad in his clogs symbolizes the fight against the water in a country where large areas lie below sea level. But these dikes are no longer sacred in today's Netherlands. Dutch dike builders, nature conservationists and government organs are increasingly coming to agree: now the sea level is rising and the rivers are bursting their banks more often because of extreme rainfall, we must allow room for the water.

## Breaching the dikes

So has dike building in the Netherlands

had its day? By no means. The height of the river dikes is being raised at strategic and economically sensitive locations, and the sea defences are being strengthened. But we are also witnessing a new approach in sparsely populated areas. Farmers are being bought out, dikes breached and nature is allowed to go its own way. There is a new appreciation of the way low-lying areas of land can absorb and store water. The province of Noord-Holland is protected by a very old dike, which once sheltered people from the Zuider Zee and now keeps back the waters of the IJsselmeer Lake. Operations to strengthen this dike have now been put on hold. The engineers need time to look at draft plans and reconsider their calculations for a new, alternative water

defence, consisting of beach faces reinforced with reeds, sand and clay to break up the waves' action and so lessen the harm that storms do to the dikes. Similar plans are being considered for both sides of the Afsluitdijk, the 30 km barrier that divides the IJsselmeer Lake from the Wadden Sea.

## Collaboration

It is both cheaper and technically simpler to 'green' the water defences than to reinforce them by tipping rocks on them. This, though, is not the only advantage, even in these days of global financial crisis. Green water defences are also multifunctional. They provide a network of ecological corridors that offer a place for rare flora and





EPA: BAGUS INDAHONO

Planting mangrove trees at a Kapuk conservation area in Jakarta.

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fauna. Especially in urban agglomerations, corridors are vital to plant and animal species that are vulnerable to climate change. A network of corridors between new and old nature reserves offers them a route to habitats where they can still be sustained. Finally, policy makers in Holland, a country built on collaboration and combining forces, are delighted about a further advantage: new natural areas have a leisure role to play; nature attracts people and that generates income. So climate buffers can generate cash, too.

### **Mangrove buffer**

Revolutions are seldom isolated, regional affairs. Evidently, then, developments in Holland are not isolated incidents. Else-

where in the world, too, 'green adaptation' is being embraced as a significant complement to hard engineering. Viet Hoang is WWF's freshwater coordinator for the Greater Mekong in Vietnam. He wants Vietnam to invest in large, biologically diverse, well-connected ecosystems. Hoang explains they will help maintain resilience to climate-change impacts and reduce the risk of climate-related disasters. "Investing in biologically diverse ecosystems lowers the risk of large losses to ecosystems and the services they provide when a drought or flood occurs." Hoang (see interview on page 44) will soon start a number of pilot projects to restore degraded mangrove forests. Mangroves form a 'bio-shield' that protects coastal settlements. Where they



This new idea for the 36 km long Dutch seabarrier the 'Afsluitdijk' does not involve raising the height of the barrier, but establishes natural tidal marshes on the sea side, to bear the brunt of occasional storm surges.

have vanished, flood damage is many times worse. "Just as in the past", Hoang says, "mangrove forests must join up to form a connected system. In all of these areas, connectivity is the key, so that species can move and processes can function appropriately." The WWF is seeking to put the importance of reclaiming delta ecosystems on the map with the World Estuary Alliance (WEA).

#### Housebuilding cancelled

The message also resounds in China. "There is a lovely nature area near Lingang Port City that was marked down for use as a residential and industrial area", says WEA chief Arjan Berkhuisen. "Local WWF staff went into action and the area is now acting as a climate buffer and nature reserve. Vanished species have even been reintroduced. At high tide the reserve traps water before it can reach the densely populated hinterland. They've cancelled housebuilding there." Berkhuisen expects more areas in the Yangtze Delta will be earmarked as natural climate buffers.

Wetlands International's Pieter van Eijk can also see a use for high moorland and marshland, which are like giant sponges that can absorb vast amounts of water. "All over the world, people have dug ditches in marshlands to drain them and reclaim them for agriculture. Rainwater drains away fast and the land compacts, with all the consequences that implies." Marshy areas should be given their old functions once again, so the water is retained longer.

#### Great white egret

Holland is experimenting with this in the provinces Groningen and Drenthe. Large areas of the city of Groningen were under water in the 1997 floods, including the university hospital and the renowned Groningen Museum. To prevent any future recurrence they are now working hard to excavate and landscape an area of 3,000 hectares, just south of the city. Agricultural land has been compulsorily purchased to set up a climate buffer. Just as in the past, the water that flows in the streams from the higher sandy soils in Drenthe will

be retained here so that the city's nearly 200,000 residents can keep their feet dry. The new nature reserve, called the Onlanden, will consist of open water, marsh, wet woodlands, wet meadowland and pasture. It is expected that many protected plant species will be able to flourish there, as well as protected wetland birds, like the great white egret, the reed bunting and the bittern. ■

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Mangrove coastline in Mekong Delta.



WWF

## Green adaptation is cost effective

'Teeb for local and regional policy makers' states that Ecosystem services can provide cost-effective municipal services. Many cities around the world, such as New York (USA) and Quito (Ecuador), pay to conserve watersheds in order to secure their drinking water supply. In Curitiba (Brazil) and Mumbai (India), city managers cost-effectively enhance flood regulation by maintaining green spaces for rainwater runoff.

In Kampala (Uganda), an assessment of a threatened wetland revealed that the alternative, a replacement wastewater treatment plant, would cost approximately US\$ 2 million annually to treat the city's effluents. Bangkok (Thailand) and Canberra (Australia) have recognized through public policy that urban health and quality of life are improved by planting trees and creating green spaces that enhance air quality. In the northern coastal regions of Vietnam, where more than 70% of the population is threatened by natural hazards, local communities have planted and protect mangrove forests, as a more cost-effective strategy than building and maintaining artificial barriers (sea dykes). An investment of US\$ 1.1 million has saved an estimated annual US\$ 7.3 million in dyke maintenance alone.