

Constructed ecosystems reduce risk of flooding

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In many locations throughout the world, protection against increasingly severe flooding can be improved by the construction of large ecosystems (e.g. tidal marshes and mangroves). In comparison with conventional flood-prevention methods, this new concept is more resistant to climate change, in addition to being more cost-efficient and having many additional social benefits.

This is demonstrated in the article in *Nature* entitled 'Ecosystem-based coastal defence in the face of global change', which was published by the University of Antwerp, in cooperation with the Royal Netherlands Institute for Sea Research (NIOZ), IMARES Wageningen UR, TU Delft and Ecoshape.

Tidal marshes

The Flemish–Dutch research team based their plea for more global applications on research conducted in Flanders and the Netherlands. One of the methods investigated involves tidal marshes. These ecosystems occur naturally along coasts and estuaries, but they can also be built by moving dikes inland or by using locks to diminish the tidal action flowing into the polders.

Natural flood protection

During storm surges, large volumes of water volumes are contained in

these new tidal marshes, thus reducing the risk of flooding in the densely populated inland areas. Tidal marshes are also efficient breakwaters, thus reducing coastal erosion and the costs associated with maintaining the underlying dikes.

The researchers also used geological and biological processes to demonstrate that tidal marshes raise themselves along with the rising sea level. These ecosystems thus act as natural dams that maintain themselves and adapt to [climate change](#).

Social benefits

Tidal marshes also provide additional social benefits. For example, they are essential growth sites for commercially interesting types of fish and shellfish; they contribute to the natural water purification of rivers and coastal areas; they can compensate for the concentration of harmful greenhouse gases; and they offer opportunities for recreation and to experience nature.

For tropical and sandier coasts, mangrove forests, coral reefs, dunes and oyster beds play a similar protective role.

Limitations

Despite the many benefits and advantageous applications in many critical regions throughout the world, there are also a number of limitations. The construction of large [ecosystems](#) requires more space than the construction of classic dams. In addition, experts currently have much less experience with these methods, and it takes several years for an ecosystem to become well established.

More information: "Ecosystem-based coastal defence in the face of

global change." Stijn Temmerman, Patrick Meire, Tjeerd J. Bouma, Peter M. J. Herman, Tom Ysebaert, Huib J. De Vriend. *Nature* 504, 79–83 (05 December 2013) [DOI: 10.1038/nature12859](https://doi.org/10.1038/nature12859)

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