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## Netherlands Looks to Float Itself Out of Harm's Way

By EVAN LEHMANN of [ClimateWire](#)

ROTTERDAM, Netherlands -- Most of this country would be underwater before the zebra-striped couch in Cees Westdijk's living room gets wet.

That reveals two things about this spongy place. The first is the problem: The Netherlands sits in a continental dent that has had the Dutch fighting the intrusion of water for centuries.

The second is a solution: Cees' home floats.

"The house is a little bit moving," says Cees, whose last name highlights the long war between the Dutch and the sea. In English, it means "West dike," a reference to the nation's protective barriers along its wave-chewed borders with the North Sea and several major rivers.

Lately, the water war has entered a phase of détente. Aggressive tactics, like building the world's biggest sea gate and creating "new islands," are being blended with more adaptive ones that simply acknowledge there will be more water and less land in the Netherlands of the future.

Take Cees' house. Positioned daringly along the Maas River in the central Netherlands, most of which lies below sea level, the two-bedroom box can ride up and down on steel poles during high water, like a floating dock. It can climb as high as 18 feet.

That's plenty, Cees notes, because by then "all of the Netherlands are underwater."

That fear has driven the Dutch to mount a major intervention against nature. They have reduced the likelihood of flooding by sealing off much of the country's fingered coast from the sea with siege-like dikes. They have turned huge estuarial bays into huge freshwater lakes. These amount to moats, used to repel intruders, in this case swelling tides and storm surges.

Threat from inland waters, too

But that's only half the threat. Water also charges into the Netherlands from the other side -- from its eastern borders with interior Europe. Powerful rivers like the Rhine drain their mountain snow melt from the Alps through the Netherlands.

"There's nowhere to run," said Ivo Demmers of the Netherlands Water Partnership, which promotes Dutch expertise on water issues worldwide. "We have to fight water."

The tactics of battle still include aggressive assaults, like fortifying dikes and draining lakes, but diplomatic concessions are also evident now. Water is given space to flow and pool.

There are 50 "water houses" in Cees' neighborhood along the Maas, the country's first large-scale effort to build floating homes. The Dutch are a commercially ambitious people, but planners are signaling concerns about expanding development in natural areas that are needed to hold excess water. The idea is to give

water space before it takes it.

Floating homes allow for commercial development without displacing flood plains. Cees' house will only float perhaps once every five years, during infrequent, but imminent, flooding. There are 36 of these "amphibious houses" along the Maas, and 14 others that float all the time.

They are constructed on platforms made of expanded polystyrene, widely used foam found in egg cartons, and concrete. The homes are made with wood frames and curved roofs. They're designed to be light. Many have lawns and gardens on top of the foam foundation.

The Netherlands sees climate change as a personal problem. Close to half of the country is below sea level, and the accelerating rise of oceans attributed to warming temperatures and expanding water threatens the country's economy, infrastructure and health, officials say.

For this reason, the Netherlands is an example of a nation quickly adapting to climatic shifts. Other nations are similarly vulnerable, like Bangladesh and the Maldives, a string of islands in the Indian Ocean whose highest point is less than 8 feet. The Netherlands, however, has the money to prepare for higher water.

"We have a huge climate adaptation program," Jacqueline Cramer, the country's environment minister, recently told reporters in The Hague, which, she noted, sits on land that would be submerged without Dutch intervention.

As the land gets dry, it sinks

The Netherlands, for example, completed a massive storm surge barrier in 1997. It can close the yawning mouth of the New Waterway with two curving arms, each 780 feet long, or the length of the Eiffel Tower. The price was \$910 million.

The country is also creating several new land areas. Islands are being built near Amsterdam and along the coast for commercial development and for breaking rising North Sea waves.

To grasp the Netherlands' floating future, you must understand its sinking past. The country lies on a large delta, a soupy flatland crossed and cut by rivers, like the Rhine, that drain to the sea from the Swiss Alps. These rivers are not canyon-shot whitewater. They bleed into the lowlands like ink spreads on flat paper. If Europe were a backyard lawn, the Dutch would be picnicking in the part that puddles.

So they drained it. Beginning 1,000 years ago, Dutch farmers used windmills to suck water from fields. Later, it was steam and then electric pumps. That made the fertile peat soil good for growing. But there is a downside. The ground doesn't just dry -- it sinks.

So a country that was already low went even lower, with many areas dipping below sea level. Wide stretches of the country's peaty inlands have sunk 3 to 4 meters because of man-made draining. Climate change is accelerating that rate, because the peat is expected to oxidize faster as temperatures rise and become drier during longer periods of drought.

"Due to climate change we expect that [by] the end of this century the subsidence rates will be increased about 75 percent," said Jan van den Akker, a scientist researching the issue at Wageningen University. Currently, peaty portions of the country are sinking by between 5 and 10 millimeters every year.

Coming soon: the climate-change-adjusted building

Rotterdam is preparing for more floods. This city and port, one of Europe's busiest, is positioned on a wide

delta. It's about 60 miles downriver from the raft of floating homes that includes Cees' house.

The city aims to be "climate proof" by 2025, when it expects to have halved its greenhouse gas emissions, built higher dikes and given water room to roam in designated areas, like playgrounds and underground parking ramps.

The city also wants to float more. Several weeks ago, it began building a buoyant pavilion with three bulbs in which cocktails can be had and conferences attended. The project is located on the city's downtown river and is meant to showcase its "climate-change-adjusted building forms," according to a promotional pamphlet.

"We truly believe that the floating concept is the ultimate climate proof way of living or working," said Arnoud Molenaar, who manages the Rotterdam Climate Office.

Floating is handy, says Cees, who paid about €350,000, or just over \$500,000, for his yellow house with a dock. But he admits that neither climate change nor just plain old flooding drove him to buy his wave-riding home.

So what did?

"That's always the question," he replied. "All the people who buy the houses, they like watersporting. That's the first reason."

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