

The Netherlands leads battle against rising sea levels

By Michael Hirst
BBC News, Rotterdam

Rotterdam does not feature highly on lists of must-see sites in the Netherlands.

Heavily bombed by the Germans during World War II, Europe's busiest port lacks the rustic charm of Amsterdam.

But city authorities are aiming to turn it into an international showcase for water management, making a virtue out of what was once its biggest threat.

Although the story of Hans Brinker shoving his finger in the dyke to stop it from bursting is a myth, Dutch expertise in this field is not in question.

With much of its land mass below sea-level, the country has been battling the sea for centuries, using dykes and windmills to control the flow of water.

Risk remains

Daniel Brakman remembers the last time Dutch sea defences were breached - in 1953.

"I was a young boy, I was home with my brother and my sister and there was water around our house as far as the eye could see," says the 63-year-old hairdresser.

The storm surge killed nearly 2,000 people and inundated swathes of land.

It prompted the Dutch to develop a delta plan which means Rotterdam now lies behind several hundred kilometres of dykes.

A network of sluices, locks and barriers give it some of the world's best sea defences, which would only be breached by a one-in-10,000-year storm.

But while the impressive Maeslant barrier, for example, could withstand a several-metre surge in water levels, the risk remains that a major flood could breach the defence system, affecting around half the Dutch population.

"A one-in-10,000-year protection level sounds very good... but it's just statistics, and that event could happen tomorrow," says Piet Dircke, professor of Urban Water Management at Rotterdam University.

Country at risk

Hurricane Katrina -

- was a clarion call against complacency, says Mr Dircke, who is also director of water programmes with the global engineering firm Arcadis.

The Netherlands has established a plan to bolster its flood protection system by making it:

- Bigger, with higher sea barriers
- More natural, through schemes to widen rivers, reinforce the coastline with sand and start building floating homes

- Smarter, using technology to provide an early warning system and evacuation plan

Rising sea levels are not the only problem facing the country. Increased urbanisation is putting pressure on sewage systems and increasing the risk of flooding, and the country is subsiding at an even faster rate than the sea level is increasing.

"We're getting more water out of Germany from the river Rhine, more from heaven, water out of the sea and out of the soil, so water's coming from four sides and we have to have answers for all four aspects," says Rotterdam's Vice-Mayor Lucas Bolsius.

All of these sources of water will be monitored by a new system, being developed by to collect and analyse real-time data, in order to evaluate flood threats.

For example, there is a plan to install sensors on dykes to raise the alarm when a barrier is about to be breached, allowing the government to give a 24-hour warning of the need to evacuate.

Live laboratory

As it works on these innovations, Rotterdam is essentially developing a live laboratory to put them to the test.

MAESLANT STORM SURGE BARRIER

- Gates are the length, and twice the weight, of the Eifel Tower
- When closed, 22m-high barrier straddles 300m-wide river
- Completed in 1997 at cost of 450m euros
- Expected to close once every 10 years, frequency doubling by 2050

With many modern ships unable to pass through the shallower waters in the city centre, the shipping industry is moving westwards, with its new deep-water port stretching over a distance of 40 km (25 miles) towards the North Sea.

This is leaving a 4,000-hectare area around the old docks where government departments are pooling their resources with universities, engineering and IT firms to develop sustainable energy technology. The city plans to halve its carbon emissions by 2025, and to reduce net emissions to zero in due course.

On a river-tour, water manager John Jacobs showed off the a hive of creativity based in one disused shipping wharf.

"It's an excellent example of how a port city can change its focus to tackle the challenges of climate change," says Mr Jacobs.

The site is now home to a clutch of vast greenhouses containing workrooms and lecture theatres where scientists and students work together with businesses and engineers to develop eco-friendly products from hi-tech bicycles to footwear made with sustainable materials.

Adapting to change

Rotterdam's ultimate goal is to make itself climate-proof - able to withstand whatever the weather throws at it - by 2025.

In addition to hi-tech water management systems, the city is also exploiting "soft technology" such as

More ambitiously, it plans to develop a 50-hectare (120-acre) floating housing development, with a neighbourhood of environmentally friendly houseboats.

The showcase for this development is a floating pavilion under construction that will be completed in time for the start of the Tour de France in Rotterdam next July.

Rotterdam hopes to share its knowledge, exchanging ideas on low-cost methods of flood protection with both developed delta cities and developing countries - like Mozambique -

"The question will be how can you transfer this technology to other areas, how can you make it suitable for countries in other climates and economic situations," says Piet Dircke.

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