



How can we keep the Netherlands liveable in the face of sea level rise?

The Sea Level Rise Knowledge Programme has investigated this question. You can read the summary of the results [here](#).



The sea level is rising. Ensuring that the Netherlands is kept safe and liveable will cost more money and require more space. We must continue to work on flood protection and learn to live with less freshwater.

What are the effects of sea level rise?



Waves and tidal currents will increase coastal erosion. If we take no additional action, the shoreline will retreat.



Storm surges will become higher. If we take no additional action, the chance of a flood will continue to increase.



More salt from the sea will enter our freshwater lakes, rivers and polders. Because of climate change, less river water will be available in the summer. This combination will cause additional salinisation, especially in periods of drought.



How will we deal with it?

We will start by upscaling the current approach.



Sand nourishments

More substantial coastal sand nourishments will increasingly be needed to prevent shoreline retreat. Right now, we need to ensure that enough sand remains available in the crowded North Sea.

Dike reinforcements

We need increasingly higher and wider dikes. In addition to sand and clay, this will also require space. We need to start earmarking that space now.

Dealing with salinisation

We cannot prevent the water in coastal provinces from becoming more saline. This process has already started. We need to adapt land use.

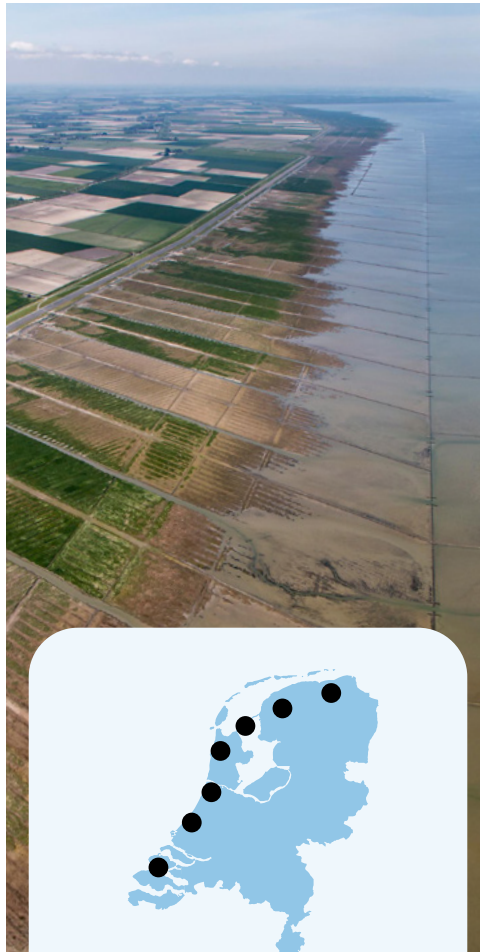
These are the basics. We will need to continue working on them at all times.

From 50 cm of sea level rise, there will be an increasing number of issues

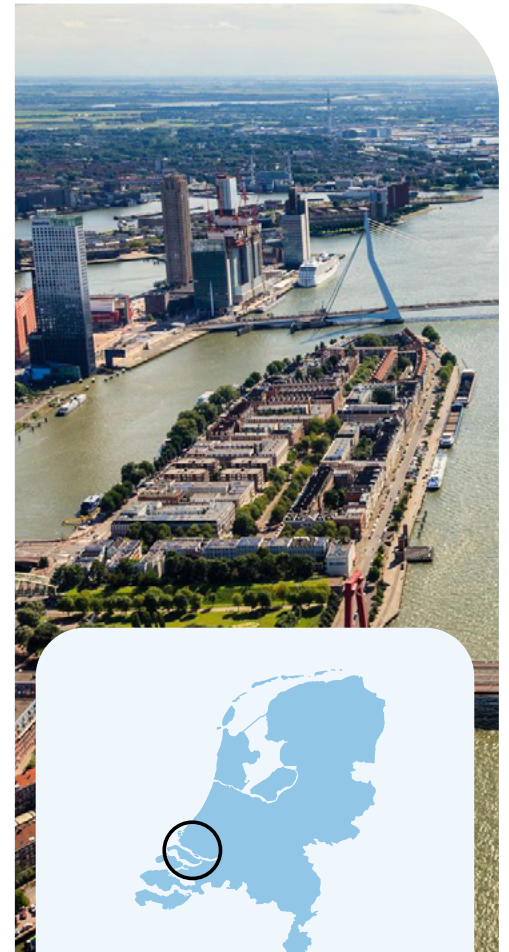
We will need to prepare for choices that will have major impact. A few examples:



We will become increasingly reliant on pumps to keep the Netherlands dry. That will consume energy and cost money. We face a choice: will we focus fully on pumping or start by increasing the (inland) water level in order to be able to continue to discharge water under gravity?



We can limit the salinisation to some extent, for example near sluices. But in the coastal provinces, we will be incapable of keeping the water fresh everywhere. We face a choice: where will we keep it fresh and where not?



In the Rotterdam region, sea level rise coincides with river water discharge. How will we keep it safe here? There are various options: such as building higher storm surge barriers, damming the Nieuwe Waterweg or completely opening it instead. All options will have a major impact on shipping, agriculture and space in the city.

Major choices like these will be feasible if we continue to invest in strong basics: upgrading dikes, more coastal sand nourishments, more pumps and learning to live with less freshwater. In some places, we can enable land-water transition zones to rise in line with sea level.

By the end of this century, all storm surge barriers will require replacement. From a technical point of view, it is possible to build new storm surge barriers. But other options are also possible. Every choice will have its consequences.

Living with sea level rise starts now



The faster the sea level rises, the faster the Netherlands will need to adapt

We can potentially still slow down the sea level rise, if we reduce worldwide greenhouse gas emissions. If that is successful, less radical and less expensive adaptations will be needed. For ourselves and future generations.

In any case, we must continue to work on flood protection and learn to live with less

freshwater. The Sea Level Rise Knowledge Programme shows that there are different ways of doing this and that we will need to prepare for major choices.

Whatever we choose, a safe and liveable Netherlands will require more money, space and raw materials.



Colophon

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