

Restoration of species diversity in dike grasslands makes dikes more resistant

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Decreased species diversity in the grasslands on dike slopes leads to a dramatic increase in soil erosion and dike deterioration. This was shown in a multi-year research project carried out by the Nature Conservation and Plant Ecology Group and the Soil Physics and Land Management Group at Wageningen University, under the leadership of Frank Berendse. The results have now been published in the international

journal *Ecosystems*.

A very large proportion of the world's population live in estuarine areas over the whole world. And it is precisely these areas that are most at risk from [sea level rise](#) and an increased peak discharge from large rivers. In the Netherlands, 9 million people live in areas protected against the sea and rivers solely by dikes and sand dunes. In these areas, 65% of the GDP is earned. The stability of the dike slopes, which mainly consist of grassland, is very important in heavy rainfall or when waves overtop the dike. Many of these dike grasslands were extremely species-rich in the past but changes in management have often led to substantial impoverishment. Wageningen University's research investigated the effects of both decreased and restored botanical diversity.

An artificial dike was set up with 100 test plots containing various numbers of plant species. During the third year of the experiment, the amount of washed-out soil accumulating at the base of the dike was measured every two weeks. A reduction of 75% in species numbers was accompanied by a doubling in erosion. This effect could be explained as follows: a larger number of species means that if one species disappears, there is a greater chance it will be replaced by another [species](#) with an equivalent effect on erosion resistance. In addition, aboveground and underground biomasses were found to be greater where the [species diversity](#) was richer, and this, too, limited erosion.

Dike safety is determined by many factors. Naturally, the dimensions and materials used are extremely important factors. Nevertheless, dike deterioration resulting from erosion must be limited as much as possible. That is why these results are so important for protecting the most densely populated [areas](#) on Earth against high water levels, but also for maintaining soil fertility in the grazed grassland slopes that play such an important role in worldwide food production.

Provided by Wageningen University

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