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Drenthe's Adaptation Picture – A resourceful regional tool to visualise climate impacts in the province of Drenthe (NL)

Climate Effects in Drenthe – Drenthe's Adaptation Picture (DAB)

The [Drents AdaptatieBeeld](#) is a platform for anyone who wants to learn more about climate change and adaptation in Drenthe. The story maps visualise the potential effects and impacts of climate hazards on the Dutch province.

Key Learnings

- **A climate change adaptation tool:** Anyone who is interested in the effects of climate change in Drenthe can use the Drents AdaptatieBeeld. The tool visualises various scenarios for 2050 and suggests adequate measures.
- **Risk assessment and prognosis:** As the province of Drenthe differs from other Dutch provinces, a tailor-made StoryMap was developed to visualise various climate scenarios and their effects and impacts on the province.
- **Following a red thread:** The StoryMaps follow a red thread addressing Drenthe's core issues. Namely, the climate is becoming dryer, more humid, and warmer, and the sea level is rising.

About the region

Drenthe is one of the twelve provinces in the Netherlands. The province covers 2.680 km² of land area and comprises of 47 km² water bodies. Drenthe has a rural character and is the least densely populated province. Unlike the other Dutch provinces, most of Drenthe lies above sea level; only some areas in the North and Southwest are below sea level, forming the “Drenthe Plateau”.

Climate Hazards

Droughts, increased humidity, temperature increase

Sector

Water management, agriculture, nature preservation, construction, infrastructure

Key system

Infrastructure

Health and well-being

Prediction modelling



Climate Threats

Climate change poses multiple challenges in the Dutch province of Drenthe. Despite getting drier and warmer, with an average temperature rise of 1.1°C over the past three decades, there has been a notable increase in rainfall, often extending over longer periods. The StoryMaps illustrate the most important current and future climate impacts on Drenthe, advocating for appropriate measures to be taken.

Currently, summers typically experience four tropical days, with temperatures surpassing 30°C. By 2050, this figure could potentially rise to a range of 6-10 tropical days. While dry summers contribute to a reduction in average precipitation, there are forecasts of localised disruptions featuring heavy rainfall. Projections indicate that by 2050, extreme rainfalls with 70mm per hour will occur twice as often as today (currently every 100 years). Despite less rain on average coupled with increased evaporation, overall conditions are expected to become drier, leading to declining groundwater levels.

Soil subsidence 2020-2050

In the Netherlands, fluctuations in groundwater levels are common and lead to subsidence - sinking of the ground because of underground material movement - a phenomenon that can be exacerbated by human activities. Drainage, for example, causes peat oxidation and consolidation, and oil and gas extraction leads to pre-exposure during site preparation. Climate change can also accelerate the process of soil subsidence, as severe weather events can cause fluctuations in groundwater levels. In Drenthe, the stream valleys and the Southeast of Drenthe are particularly prone to subsidence.

Subsidence can cause damage to buildings, roads, bridges, sewage systems, cables, and drainage. Uneven subsidence can cause flooding and increase potential flood depths. Peat oxidation also leads to CO₂ emissions and reduced water quality. In the Netherlands, the drainage of peat meadows annually leads to CO₂ emissions of 5.6 million tons of CO₂ equivalent.

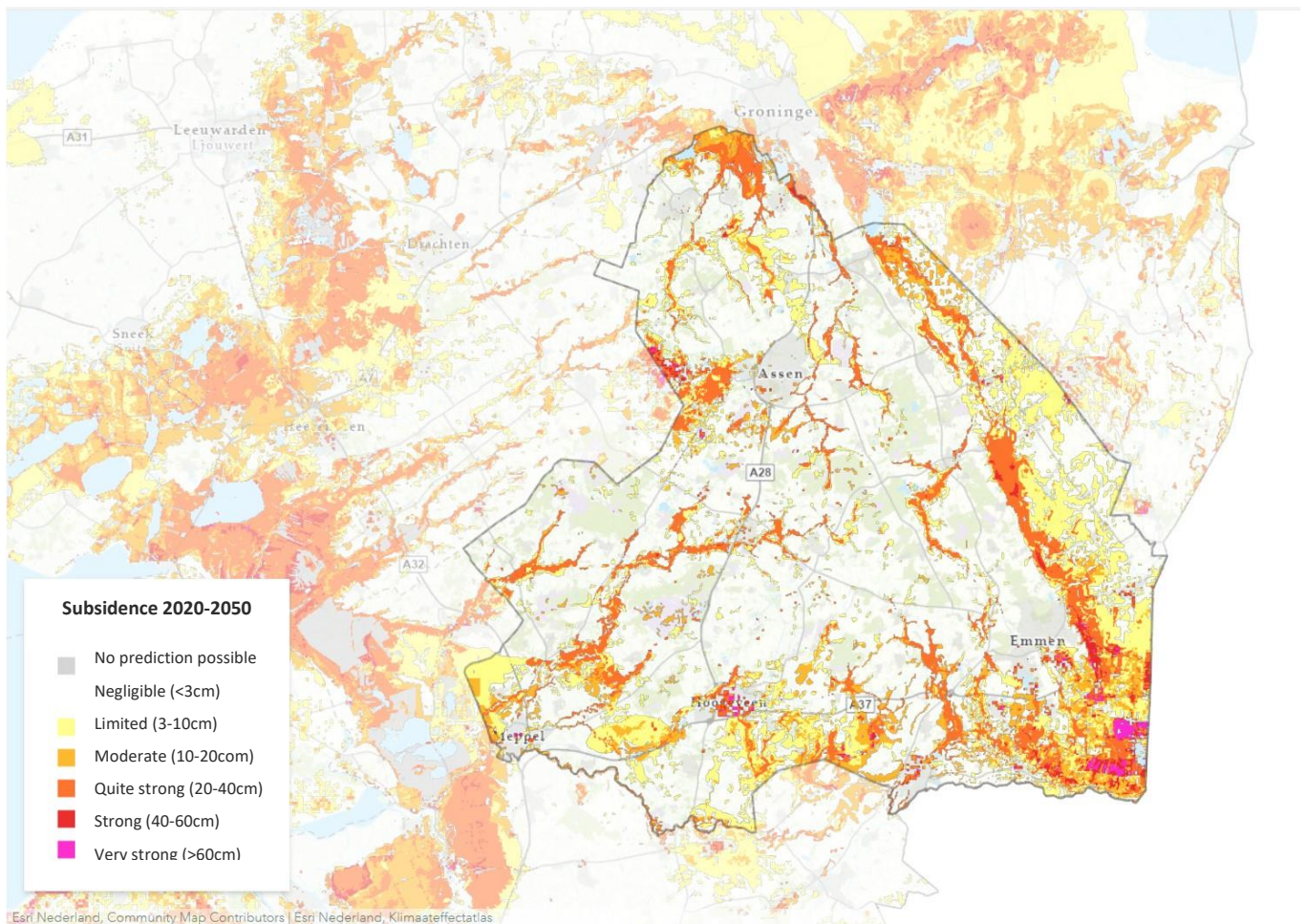


Figure 1: Estimated Subsidence in Drenthe from 2020-2050. (Source: *Klimaat-effectatlas: Deltares, TNO & WENR (2021) bodemdalingsvoorspellingskaarten, partly modified*).

Risk differences due to construction

Before 1975, many buildings were constructed on timber, or so-called “on steel” foundations. Both types can be vulnerable to damage when the subsoil contains peat or clay. Buildings can sink unevenly due to changing subsoil compositions, uneven weight distributions, or a weak foundation. Consequently, buildings tilt, and damages occur. Climate change can aggravate the threat of subsidence, as drought conditions can accelerate soil sinking and cause deeper clay layers to shrink and swell.

Therefore, soil subsidence can become a costly issue. Factoring in climate change, potential foundation damage costs in the Netherlands could range from 8 to 54 billion euros.

As part of Drenthe’s Adaptation Picture (DAB) the risk map ([Foundation risk map - Klimaat-effectatlas](#)) indicates the risk of construction on steel due to subsidence by 2050 considering both weak and strong climate change scenarios. The differential risk map comprises two underlying maps. The maps in the Climate Impact Atlas provide a prediction of soil subsidence in the Netherlands based on the following causes:

- Drainage of slack soil
- Mineral mining

- Taxing soft soil

These three causes represent major risks for the infrastructure and the economy of the region.

Water supply from IJsselmeer

In dry years, Drenthe depends on surface water supplies from the IJsselmeer. During drought periods, the demand for water from IJsselmeer increases for the North of the Netherlands, potentially leading to a water shortage in the IJsselmeer region. Consequently, existing management measures may prove insufficient, requiring reductions in the IJsselmeer region's water usage. As many people are unaware of this problem, the tool provides information about the water supply to enable behavioural changes in the local population in Drenthe.

Maps and data

The Maps and data show the risks of flooding, drought, and other climate change impacts in Drenthe. This information can be taken and translated into adaptation measures to reduce those risks. For instance, the construction of flood defences, wetland restoration, and a shift in land use can mitigate the impact of climate change. The tool also provides expertise and advice on climate change adaptation. Furthermore, the platform is a gateway to other resources on climate change adaptation, such as governmental websites and scientific reports. Henk Jumelet, Executive Board Member for the Province of Drenthe, describes the platform in one of his statements.

“The platform provides access to knowledge and information to help us better understand what climate change means for Drenthe, and to guide our choices regarding the environment, for now, and for the future. The tool facilitates discussions regarding the effectiveness and necessity of environmental measures.”

Henk Jumelet, Executive Board Member for the Province of Drenthe

Examples of information on the Drents AdaptatieBeeld

- Maps of flood risk: The platform provides information about the areas of Drenthe that face the highest risk of flooding due to high river levels, heavy rainfall, and storm surges. These maps can be used to identify areas where flood protection is necessary and help plan measures to tackle future flooding events.
- Information on drought risk: The platform also includes information about the drought risk in Drenthe including maps of the areas with the highest risk, as well as information about the impact of the drought on agriculture, water resources, and the environment.
- The maps provide information on the climate impacts of different sectors that are important for the province of Drenthe. For example, agriculture, the built environment, recreation etc. The maps show the different effects of climate change on these sectors and elaborate on their impacts.

Conclusion

In conclusion, climate change presents significant challenges for the Dutch province of Drenthe. Despite experiencing increasing dryness and warmth over the past three decades, accompanied by a notable rise in average temperatures, there has been a concurrent increase in rainfall, often occurring over extended periods.

The StoryMaps effectively illustrate the current and anticipated climate impacts on Drenthe, highlighting the urgent need for appropriate measures to be taken. As summers are projected to become hotter and potentially more unpredictable, with an increase in both dry spells and heavy rainfall events, the region faces heightened risks of drought, flooding, and soil subsidence.

Ultimately, the Drenthe's Adaptation Picture (DAB) is a vital resource for decision-makers, enabling them to navigate the complex challenges of climate change and soil subsidence in Drenthe. By leveraging the information and tools provided by the DAB, the province can proactively anticipate risks, enhance resilience, and safeguard its communities and environment for generations to come.

Summary

The Drents AdaptatieBeeld is a valuable tool for anyone who wants to learn more about climate change and adaptation in Drenthe. The platform provides extensive information as a basis for making informed decisions about adaptation planning and investment.

Further information

[Drents AdaptatieBeeld \(drenthe.nl\)](https://drenthe.nl)

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