Climate adaptation with Nature-based Solutions in the Aa of Weerijs catchment

Year of issue

2025

Summary

The Aa of Weerijs pilot tests how Nature-based Solutions can build drought resilience in a flat, sandy catchment between Flanders and Noord-Brabant. Led by IHE Delft within the EIFFEL H2020 program from 2021 to 2024, partners include Open University, the Province of Noord-Brabant and Water Board Brabantse Delta. The team co-designed a decision-support web app to compare options and support planning.

Models combine GEOSS and local datasets with KNMI’23 climate scenarios. KPIs track surface water availability, groundwater availability and soil moisture. Provincial opportunity maps and green-blue policy zones steer siting where benefits and feasibility align.

The strategies assessed cover ditch blocking, infiltration ponds, wetland restoration, heathland restoration, brook bed barriers and tree planting. Results indicate the strongest gains for groundwater and soil moisture from ditch blocking, infiltration ponds and heathland restoration. Wetland restoration and brook bed barriers show mixed performance across subareas. Tree planting often reduces drought indicators in some locations due to higher evapotranspiration.

Outputs include prioritised maps, combined strategies aligned with policy zones and agricultural areas, and a transparent web interface used in workshops. No physical works were built within the project window. The package readies local actors for investment and monitoring. The pilot links WFD objectives with provincial nature and water policies, including the Nature Management Plan and Green-Blue values layer, to scale NBS where they deliver multiple benefits. Cross-border hydrological controls, canalised networks and competing water uses remain constraints. Key lesson: in sandy lowland basins, infiltration-focused measures outperform planting for hydrological drought resilience. The toolset persists beyond the grant to support implementation and monitoring.

Photo Gallery



Location

51.5926, 4.7714

Project

SpongeScapes

NWRM

Sector

Hydromorphology

Installation Date

2021 to 2024

Implementation status

Modeled

Contact

IHE Delft

Overview

Location of the project

Transboundary Aa of Weerijs catchment, upstream Flanders and downstream Noord-Brabant, NL.

Country

Netherlands

NUTS2 Code

Noord-Brabant

Sponge measures implemented in the case study

Wetland restoration and management

Ponds and scrapes

Afforestation

Objectives

Increase surface and groundwater availability and soil moisture under KNMI’23 scenarios
Assess soil carbon co-benefits for selected NBS
Support co-design and decision-making with a web application.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
Research institute / University	IHE Delft Institute for Water Education	Determination of design details of the measure	hydrological modelling and decision app	Responsible
Regional / sub-national water authority	Province of Noord-Brabant	Other	policy links and opportunity maps	Responsible
Regional / sub-national water authority	Water Board Brabantse Delta	Other	data and advice	Supporting
Architects / Engineers	KNMI	Determination of design details of the measure	climate scenarios	Supporting

Site Information

Climate Zone

Cool temperate moist

Temperature (°C)

10.00 °C

Evapotranspiration

500.00 mm

Runoff coefficient

0.40

Elevation range

5 to 30 m

Slope range

Very low slopes under 1%

Groundwater level

Shallow groundwater 0.5 to 3 m below surface

Vegetation class

Predominant land cover cropland, grassland, wetlands, heathland.

WFD Ecological status

Poor

WFD Chemical status

Failing to achieve good

Water quality status

Historic drainage and canalisation, drought stress, irrigation demand, and habitat degradation.

Design and Implementation

Project scale

Meso

Project scale specifications

river-basin planning and modelling

Project area

149 km²

Principles

Co-design with stakeholders

Use of GEOSS and local data in an integrated surface–subsurface model

Opportunity-map-led siting of NBS

Evaluation with drought-related KPIs.

Factor constraints

Flat relief and sandy soils favour infiltration-type NBS

Canalised network and cross-border influences constrain control on low flows and water tables.

Financing

Financing authorities

Authority name	Type of funding	Comments	Financing share
Horizon Europe	Other	EU Horizon 2020, EIFFEL Grant Agreement 101003518 4,999,466.25 € for the project, including this pilot.	100 %

Compensations

No

Policy and Governance

Policy description

Water Framework Directive objectives and provincial nature and water policies in Noord-Brabant, including the Nature Management Plan areas and the Green-Blue Mantle concept used to frame Strategy 1 and Strategy 2.

Part of a wider plan

Yes

Wider plan

Wider plan focus	Name	Comments
Climate adaptation	EIFFEL Project	Earth Observation applications for climate change adaptation & mitigation

Public consultation

No

Consultation activities

Activity stage	Activity type
Screening phase	Workshops and consultations with province and water board using the pilot web application interface.

Has contractual arrangements

No

Impacts and Monitoring

Monitoring System

Monitoring parameters

Monitoring system and methods

Hydrological model calibrated and validated with GEOSS and local data

KPIs include surface water availability, groundwater availability and soil moisture index

Climate forcing from KNMI’23 scenarios.

Maintenance

Maintenance requirements

Not applicable yet, as physical measures were not implemented during the project.

Socio-economic Impacts

Direct benefits

Decision support improves planning for drought resilience and engages stakeholders across sectors.

Biophysical impacts: Hydrology

Information on retained water

Modeled impacts :

Best performance on groundwater and soil moisture from ditch blocking, infiltration ponds and heathland restoration

Tree planting produced negative effects in several sections due to higher evapotranspiration

Wetland restoration and brook bed barriers showed mixed effects across sub-areas.

Lessons Learned

Key lessons

Prioritise infiltration-focused NBS on sandy soils for drought resilience

Evaluate combined strategies across policy-defined zones to scale up effects

Tree planting can worsen drought metrics in some sub-catchments.

Barriers

Barrier type	Barrier role	Comments
Lacking coordination between authorities	Main barrier	Cross-border hydrological control and competing sectoral demands
Attitude of the public	Secondary barrier	Variable community support and uncertain effectiveness for some measures.

Drivers

Driver type	Driver role	Comments
Availability of subsidies	Main driver	EU funding

Success factors

Success factor type	Success factor role	Comments
Existing staff and consultant knowledge	Main factor	robust modelling tools, existing opportunity maps and provincial policy frameworks
Attitude of relevant stakeholders	Main factor	Active role of province and water board in co-design

Sources

Sources

Surface-subsurface interaction analysis and the influence of precipitation spatial variability on a lowland mesoscale catchment

Climate adaptation in Aa of Weerijs (pilot web app)

Climate adaptation in the transboundary Aa of Weerijs for addressing water scarcity challenges (EIFFEL Factsheet)

IHE Delft project creates web application to assess nature-based solutions for climate adaptation

KNMI’23 climate scenarios for the Netherlands – User report

REVEALING THE ROLE OF GEOSS AS THE DEFAULT DIGITAL PORTAL FOR BUILDING CLIMATE CHANGE ADAPTATION & MITIGATION APPLICATIONS (EIFFEL) – CORDIS Fact Sheet

Natuurbeheerplan Noord-Brabant 2025

Omgevingsverordening, Groenblauwe waarden (OMGW.OVR_25_GBM_V)