Horstergrub sediment management, Belgium

Year of issue

2025

Summary

Upstream of ’s-Gravenvoeren (Voeren), the Horstergrub measure keeps muddy runoff in the valley with an earthen dyke/dams, and farmland was shifted from maize to grassland to curb erosion. Within the cross-border Aquadra programme (2009–2013), works were delivered: in Dec 2012 an earthen dam and two erosion ponds were built in the Horstergrub to trap water and sediment before it reaches the village. The Horstergrub is a dry valley that only flows during rain; Voeren’s 2023/24 Hemelwater & Drought Plan lists an existing “erosiebuffer op Horstergrub” (~30,600 m²). Since 2022–2024, the Dutch water board notes standard-compliance issues on the Horstergrub in Mheer and is developing a new rainwater buffer near the border at Pletsgatweg (Mesch), in coordination with VMM, with a throttled outlet to limit peaks. Together, these actions complement the original NWRM goal of slowing runoff and reducing sediment delivery to ’s-Gravenvoeren, while addressing today’s cross-border flood-risk needs.

Photo Gallery



Location

50.7585409, 5.7720445

Project

NWRM

National ID

Belgium_02

Sector

Hydromorphology

Installation Date

2008

Contact

Heather Williams and Chris Binje, AMEC

Overview

Location of the project

The site is located in a rural location on the Horstregrub stream, upstream of the village of Gravenvoeren. It is located in the catchment of the River Voer, which is itself a tributary of the Meuse.

Country

Belgium

NUTS2 Code

Prov. Limburg (BE)

Sponge measures implemented in the case study

Ponds and scrapes

Meadows and pastures

Objectives

Retain mud/erosion consequences by a horizontal dyke/dam and ponds at the valley bottom to hold water longer, reduce runoff & sediment toward downstream villages, and convert maize to grassland upstream; storage ~6,000 m³.

Involved partners

Authority type	Authority name	Authority role	Comments
Other	Province of Limburg	Other	The Belgian province of Limburg

Authority type	Authority name	Authority role	Comments
Other	WRO	Other	The WRO (Waterschap Roer en Overmaas) is the local water authority on the Dutch side of the border. Although not directly involved, RWO Was responsible for a different pilot project upstream on the Horstergrub, also contributing to decreasing the flood risk.
Other	—	Initiation of the measure	The local community of Voeren was involved as a full partner, initiating and financing the NWRM and appointing the VMM as executional officer of the program. The community of Voeren was furthermore involved in the entering into compensation agreements with local farmers.
Regional / sub-national water authority	VMM	Implementation	VMM was appointed as the executing agent of the project, including the detailed design.

Site Information

Climate Zone

Cool temperate moist

Precipitation

800.00 mm

Temperature (°C)

10.00 °C

Elevation range

92 m

Slope range

5-10%

Vegetation class

Hilly grasslands. At the wider Voerstreek Natura 2000 site, land use is dominated by agricultural areas (significant cropland/grassland) with large patches of deciduous woodland on valley slopes (≈42% of the SBZ area in the forest inventory).

WFD Ecological status

Poor

WFD Chemical status

Failing to achieve good

Water quality status

Key pressures in the Voer sub-basin: diffuse agricultural pollution & sediment (erosion/mudflows) and incomplete sanitation, with several reaches rated moderate–insufficient; sanitation & erosion control are priorities.

Design and Implementation

Project scale

Micro

Project scale specifications

It’s a site-specific intervention in one dry valley branch (Horstergrub): an earthen dyke/dam with two erosion ponds plus land-use change on nearby fields.

Constraints

There are no specific constraints to the application of this measure type, which is a simple method of runoff capture.
The Horstergrub is a dry valley (not a classified watercourse) that conveys intense runoff during rain and points directly toward the village hence repeated water/mud problems.

Financing

Total cost

55000.00 €

Costs investment

55000.00 €

Financing authorities

Authority name	Type of funding
Commune of Voeren	Local funds

Compensations

Yes

Compensations basis information

In order to receive the necessary subsidies from the Flemish authorities, the agreements still have to be approved by the municipal council.

Compensations scheme information

Some compensation was agreed with the landowner to change the landuse to pasture. Compensation was provided to local farmers in exchange for maintaining the areas surrounding the established grassed buffer zones.

Policy and Governance

Policy description

In the area of the project a lot of erosion happens during heavy rainfall events. As there is no natural stream or other way of transporting rainwater away, surface runoff occurs over the area, causing mudstreams or floodings in the village downstream. Measures to prevent this from occurring were therefore needed.

Land ownership

Private farmland. Works were built under an agreement with the landowner (compensation for converting maize to grassland); Commune of Voeren initiated/financed and appointed VMM to execute.

Policy targets

Erosion Control

Runoff control

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus	Name	Comments
Regional	Water	Aquadra	Aquadra had as a purpose to strive for clean water conditions across regional and national borders. Partners in the project included the Dutch and Belgians provinces of Limburg, province of Liege, regional water authorities from these 3 provinces and the German city of Aachen.

Public consultation

No

Has contractual arrangements

No

Impacts and Monitoring

Monitoring System

Monitoring requirements

Multiple organizations, including the Province of Limburg, the Flemish Environment Agency (VMM), and local municipalities, are involved in overseeing the implementation and monitoring of these measures.

Monitoring parameters

Regular visual assessments are conducted to identify any signs of structural damage, sediment accumulation, or vegetation issues in the erosion control structures, such as the retention ponds and dikes.

Impact Assessment Methodology

Performance impact assessment method

Unknown

Biophysical impacts: Hydrology

Information on retained water

6000 m3 total storage volume

Information on increased water storage

6000 m3 total storage volume, compared to zero previously

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

The landuse upstream has been changed from crops to grassland, which allows an increase in diversity compared to the previous land use.

Biophysical impacts: Water & Soil Quality

Water quality overall improvements

Positive impact-WQ improvement

Information on water quality overall

Reduction in transfer of sediment and associated nutrients or other pollutants downstream, by allowing sediment deposition in the storage area

Soil quality overall improvements

Positive impact-SQ improvement

Information on soil quality overall improvements

The Voeren area is an area with significant erosion problems, causing mudstreams in the center of the village of Gravenvoeren. As a result of this NWRM, less good quality soil will be eroded and transported downstream.

Ecosystem erosion control

Yes

Information on ecosystem erosion control

Not quantified

Biophysical impacts: Others

Ecosystem impact climate regulation

Not relevant for the specific application

Lessons Learned

Key lessons

Low-cost measures can make a significant local improvement to runoff and sediment load problems.

Drivers

Driver type	Driver role	Comments
Past flooding events	Main driver	Past flooding events have occurred in the village of Gravenvoeren

Transferability

Highly transferable to small, erosion-prone headwaters with dry valleys (“holle wegen”) and arable slopes, common across Flanders, Wallonia, the Netherlands, and similar loess landscapes. But success hinges on sizing, outlet control, land agreements, and maintenance.

Sources

Sources

Pilootprojecten Stroomgebied Voer

Valleien in balans – Samen in actie voor een natuurlijk en weerbaar landschap

Water-Land-Schap Voerstreek

Vers un paysage résistant au climat

Conseil communal de Fourons du 28 avril 2016

Analyse van de relatie tot het landschap in Voeren

Hemelwater- en Droogteplan Voeren (HWDP), versie 1

Erosiewerken uitgevoerd in de Horstergrub (Greb) te ’s-Gravenvoeren