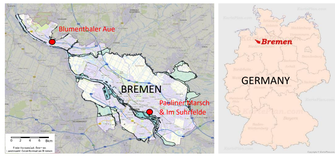
Living labs and local partnerships as tools for flood prevention – experiences from two flood-prone urban areas in Bremen, Germany

BRESILIENT

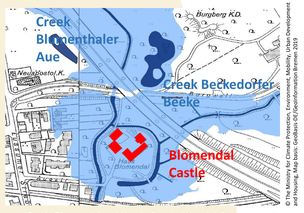
The city of Bremen lives near and with the water. About 84% of Bremen's surface area is potentially at risk of flooding due to storm surges from the North Sea. The city thus holds a strong flood protection system that protects most but not all areas from high water levels of the river Weser. Facing an increasing threat of floods from storm surges and heavy rainfall due to climate change, there is a need to design adaptation and precautionary measures, especially for unprotected areas. As part of the project „BREsilient – climate resilient future city Bremen“ (2017 – 2023), living labs were established in two especially flood-prone but at the same time intensively used urban areas to examine local flood risks and develop adaptation measures in a participatory process together with affected stakeholders (e.g. residents, associations, organisations) and representatives from politics, administration and science. The labs were established to include the knowledge, interests and ideas of the different participating users and stakeholders in the planning of future risk prevention measures and to strengthen risk awareness and self-protection of the neighbourhoods and stakeholders.



Heavy Rainfall Prevention Blumenthaler Aue

The historic Blomendal Castle is located within a designated floodplain at the confluence of two creeks in a depression without flood protection facilities. Due to the small catchment area it can be affected by flash floods in the event of heavy rainfall. The castle complex comprises a day care centre and an archive and is regularly used for events. Additionally, there are some houses on the edge of the floodplain.

In the project BREsilient, a risk assessment was carried out to better understand the effects of heavy rainfall in the area and options for dealing with potential flooding were developed together with residents and stakeholders in 9 workshops from 2019 to 2023. The results of the living lab include:



Castle Blomendal and the designated floodplain (light blue).

Establishment of the Heavy rain partnership Blumenthaler Aue

An association of affected residents, clubs, companies and other institutions with administration and politics for a long-term regular exchange of information and experience. The goal is to sustainably anchor the awareness of heavy rain and flood hazards and to strengthen the self-provision of those affected.

Establishment of the Heavy rain partnership in August 2022

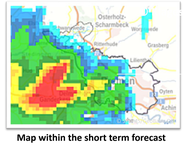
Information material heavy rainfall prevention

- Two information boards on the castle grounds
- Brochure "Heavy Rain Prevention - Safe Together!“
- Website: www.starkregenpartnerschaft.de
- Fact sheets on risk assessment and the participation process
- Annual campaign “Blumenthal Water Day” with information an funding options for heavy rainfall prevention addressing house owners.

Information board for heavy rain precaution

Short-term forecast & new measurement devices

The site-specific system enables more accurate forecasts of heavy rainfall for the Blumenthaler Aue catchment area. In the event of approaching heavy rain, an automated e-mail can be sent. Additionally, new measurement devices provide real-time data on the water levels of the creeks.



Map within the short term forecast system

And what do the stakeholders say?*

~94 % agreed that the workshop meetings contributed to the development of partnerships "at eye level" between the different participants.

~82 % agreed that the meetings had (further) increased their motivation to implement or support flood prevention measures within the scope of their possibilities.

~88 % agreed that the partnerships are appropriate measures to improve heavy rainfall / storm surge prevention in the areas affected by flooding.

* Results of a survey conducted by the University of Oldenburg at meetings of the storm surge partnership on November 16th 2021 and of the heavy rainfall partnership on October 12th 2021 (similar positive evaluations at other partnership meetings).

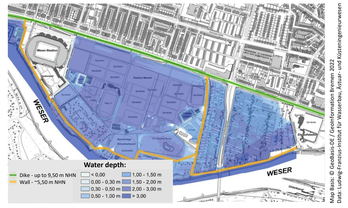
Starkregen•Partnerschaft Blumenthaler Aue

Sturmflut•Partnerschaft Pauliner Marsch

Storm surge prevention Pauliner Marsch & Im Suhrfelde

The popular recreation area ‚Pauliner Marsch & Im Suhrfelde‘ is located in the heart of the city in front of the dike and is intensively used by sports and allotment garden clubs. A few people also live in the designated flood risk area, which is protected from flooding only to a limited extent (5,50 m NHN – height above sea level) by an earth wall. In the event of a severe storm surge (>2,5 m above average high water tide) the area could be flooded up to 4 m high in extreme cases.

In order to be prepared for increased storm surge water levels caused by climate change and to minimize potential damage in the flood-prone area, a risk assessment was carried out and precautionary measures for dealing with flooding were developed together with residents and stakeholders in a living lab from 2019 to 2023 consisting of 11 workshops. Implemented measures include:



Effects of a severe storm surge with a peak value of +6,50 m NHN

Establishment of the Storm surge partnership Pauliner Marsch & Im Suhrfelde

An association of affected sports and garden clubs and companies with administration and politics for a long-term regular exchange of information and experience. The aim is to sustainably anchor the awareness of the storm surge risk and to strengthen the personal provision of those affected.

Establishment of the storm surge partnership in September 2022

Information material on storm surge prevention

- Six information boards in the area
- Brochure "Storm Surge Prevention - Safe Together!“
- Website: www.sturmflutpartnerschaft.de
- Fact sheets on risk assessment

Fact Sheets and brochure

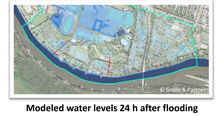
Object protection consulting

Sports and allotment garden clubs were given detailed advice on potential impacts and adaptation options for their buildings and outdoor areas.

Potential water levels in the building of a sports club

Feasibility study – improving drainage

Hydraulic modeling to examine which measures could achieve faster drainage of the area after flooding.



Modeled water levels 24 h after flooding up to +6.50 m NHN with successful implementation of measures

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