

BEERSE, BELGIUM

CONTEXT

Region: Flanders
Timeline: 2011 to 2021
Flood type: Fluvial
Surface area: 1,57 ha
Households: Approx. 60

SOCIO-DEMOGRAPHY

Population overview:

- Population: 18,261 inhabitants
- Surface area: 37,36 km²
- Population density: 487 inhabitants / km²
- Flooded Area: 31%
- Average Age: 42

Population Diversity:

- 15.4% of residents have a non-Belgian origin (9.7% EU, 5.1% non-EU)

Vulnerability:

- 19.1% have a lower than €10,000 income
- 2% receive social welfare benefits
- 4.1% live in social rental housing
- 10.7% of children come from underprivileged families

VULNERABILITY

While the project demonstrated community involvement, questions about justice and inclusivity arose. The organization's approach did not comprehensively address socio-spatial inequalities, as residents were invited based on area proximity without assessing vulnerability or flood risk exposure. This raised concerns regarding inclusive participation, social impact, and justice. To address these issues, a more targeted approach is recommended, identifying vulnerable communities or individuals at higher risk of climate-related events. Strategies should be developed to mitigate negative social impacts, such as displacement prevention, addressing green gentrification, and protecting vulnerable populations.

CASE DESCRIPTION

Beerse, a municipality with 18,261 inhabitants, is situated in a flood-prone area within the Scheldt basin. Recurrent flooding issues, primarily caused by heavy rainfall and river overflow from the Laak River, have prompted action. The flood control area, covering 1.57 hectares, was established in response to these challenges. It is a nature-based solution intended to mitigate the flood risk of the Laak River. This strategic location was acquired in 2017 through a collaboration



between the Province of Antwerp (75%) and the Municipality of Beerse (25%). The construction of the flood control area began in 2021, as part of the Interreg CO-ADAPT project.

POPULATION INVOLVEMENT



The flood control area project in Beerse exemplifies a co-creation process involving various stakeholders. To ensure community involvement, citizens were actively engaged in the

design process through a multi-faceted strategy. The Province of Antwerp initiated the process by surveying local residents to gauge their opinions on climate change, flood risks, and the proposed flood control area. Generally, residents expressed support for the plan.

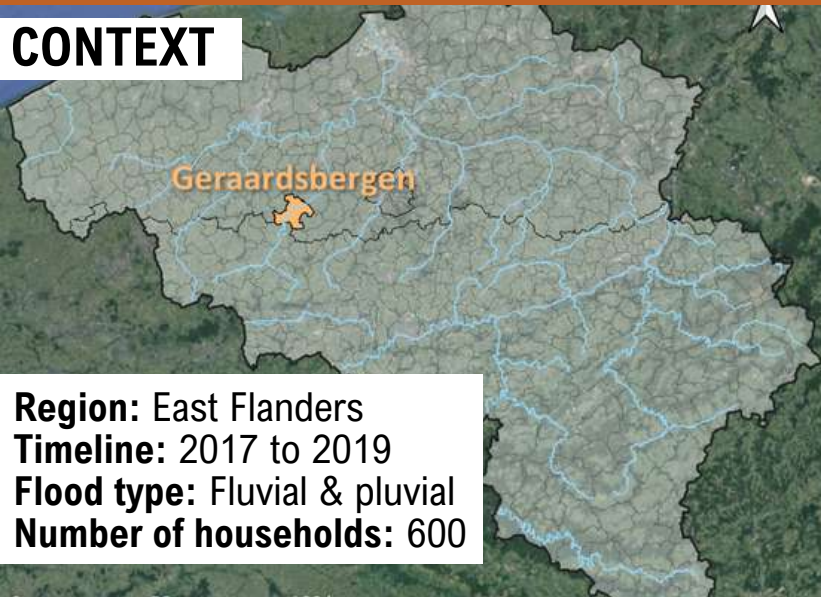
Subsequently, two participation events were organized collaboratively by the Province and the Municipality of Beerse. During these events, residents had the opportunity to contribute to the design of the area. Their input emphasized not only addressing flood risks but also creating a space for nature experiences and recreation.



Does vulnerability to flood risks encompass an issue of equity?

GERAARDSBERGEN, BELGIUM

CONTEXT



Region: East Flanders
Timeline: 2017 to 2019
Flood type: Fluvial & pluvial
Number of households: 600

SOCIO-DEMOGRAPHY

Population overview:

- Population: 34,366 inhabitants
- Surface area: 80,05 km²
- Population density: 425 inhabitants / km²
- Flooded area: ~600 households
- Average age: 43

Population diversity:

- 16,6% of residents have a non-Belgian origin (4.5% EU, 10.9% non-EU)

Vulnerability:

- 17% have a lower than €10,000 income
- 3.9% receive social welfare benefits
- 1.1% live in social rental housing
- 19.2% of children come from underprivileged families
- 13,6% have chronic illnesses

VULNERABILITY

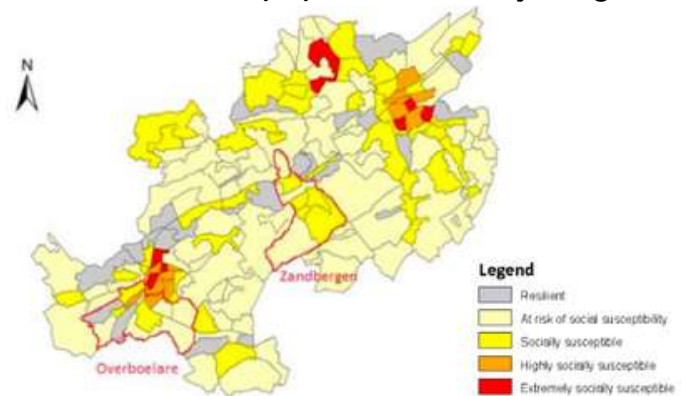
Even though information meetings were addressed to the whole population of Geraardsbergen, many households did not participate in the project, which might be due to the cost and the lack of awareness. Even though the city is characterised by a diverse set of social profiles, no measures were taken to ensure the participation of socially vulnerable people. While subsidies were offered, the households had to cover the full cost of PLP installation beforehand, which might not be feasible for all. While both a basic “cheap” and complete “expensive” plan of PLP implementation were proposed to households, those were not equally efficient. However, socioeconomic status do not determine the requirement for a high or low protection. Hence, there might be a

CASE DESCRIPTION

Geraardsbergen is located in a hilly valley and crossed by the canalized and fast-flowing Dender river. Floods can occur due to sudden rises of the river after extreme rainfall events. As collective protective measures were already implemented but insufficient, the Flemish Environment Agency (VMM) launched an individual-scaled project in collaboration with the municipality. The idea was to give tailored advice about implementation possibilities of Property-Level Protections (PLP) to the population. The involvement into the project was up to the households. A subsidy covering up to 50% of PLP installation costs (max. up to €250) could be provided by the municipality, if asked.

POPULATION INVOLVEMENT

In order to get the population to implement PLP as a flood risk mitigation measure, information meetings for all inhabitants were held. 83 households signed up to receive tailored advice from technical experts, 7 fully implemented the advised PLP measures and 18 partially. The preparatory phase of the project did not involve the population at any stage.



mismatch between the need for PLP and the ability of people to implement them. Social vulnerability is known to exist but is not effectively considered in flood risk mitigation. The involvement of insurance companies into funding prevention measures and better collaboration between policy domains might be leads to address socio-spatial vulnerability.

Does vulnerability to flood risks encompass an issue of equity ?

BLOIS, FRANCE

CASE DESCRIPTION

CONTEXT

Region: Loir-et-Cher, Centre-Val de Loire
Timeline: 2000 to 2021
Flood type: Fluvial
Households: 400



Blois, situated along the Loire, has used dykes and the Bouillie weir since the 17th century to prevent flooding. Since 1920, water levels have not exceeded 5 meters, preventing major damage. After the 1907 flood, La Bouillie underwent informal development, attracting a population mainly from the working classes and travellers. The area was considered marginal and at risk of flooding, which kept land prices low, providing affordable housing for the working classes. However, in the 1990s, studies revealed the increased risk of flooding in the town due to growing urbanisation and the obsolete weir. Since 2003, de-urbanisation measures have been taken in La Bouillie to restore the flood retention area and improve flood protection. Around 135 homes and 14 businesses have been relocated to new deferred development zones. La Bouillie, which has been de-urbanised, is envisaged as an opportunity for "regeneration", but the project has encountered difficulties, transforming the area into a relegated zone. The area is now perceived as a buffer zone and occupied by people with alternative and marginal lifestyles such as "travellers". Local decision-makers are seeking to make La Bouillie a symbol of change towards a sustainable city, but plans are currently at a standstill.

SOCIO-DEMOGRAPHY

Population overview:

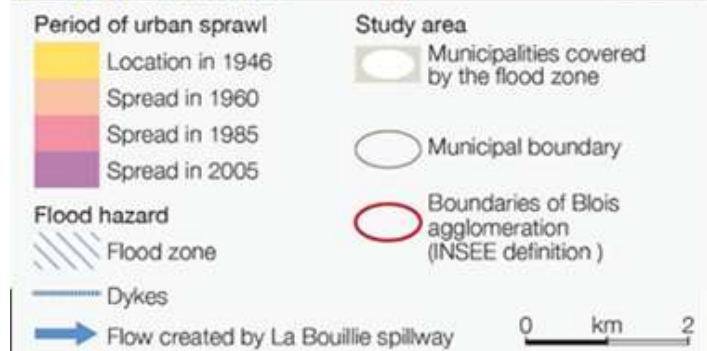
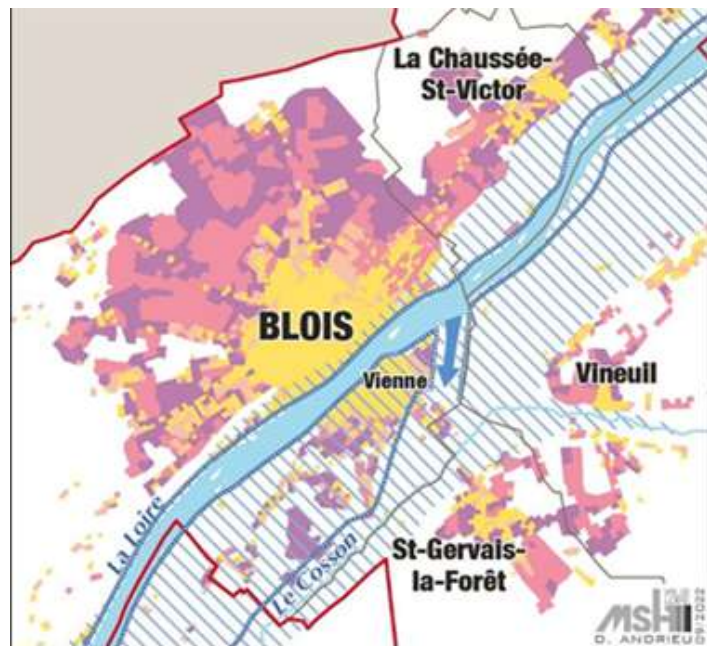
- Population: 45,710 inhabitants
- Surface area: 37,46 km²
- Population density: 1,220 inhabitants / km²
- Flooded area: 400 households
- Average age: 41

SOLUTIONS AND PROJECTIONS

The de-urbanisation of La Bouillie went through two phases of participation: firstly, the uninvited participation of former residents, who were faced with insufficient recognition and losses that were not taken into account. Their involvement was limited by a technical approach focused on safety and the perception that their proposals ran counter to flood risk management policies. Secondly, the establishment of formal participation mechanisms was crucial in legitimising the redevelopment project. However, these processes were symbolic, with limited impact on decisions. The lack of a culture of participation among local residents has contributed to a limited number of proposals, mainly used to calm relations between residents and the La Bouillie area.

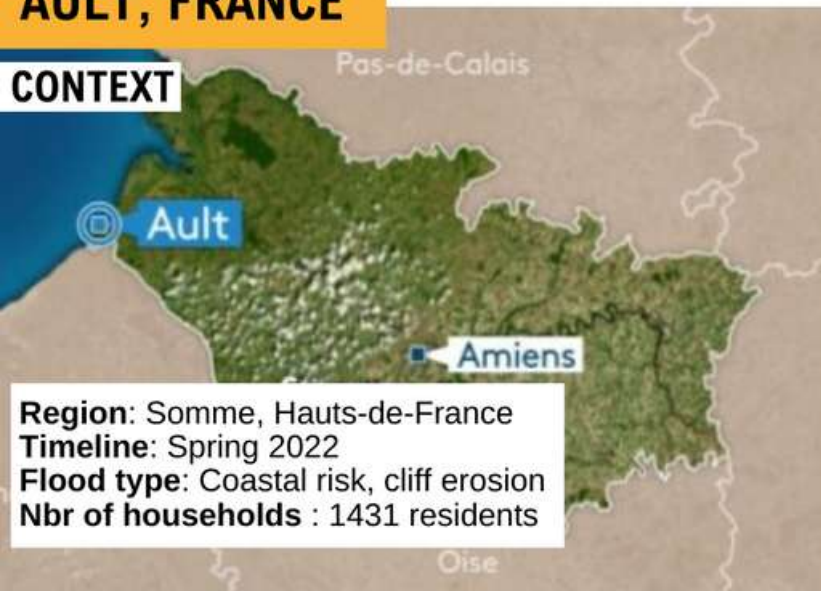
VULNERABILITY

The initial plan to relocate to La Bouillie, which focused on reducing the risk of flooding, overlooked the social vulnerability of local residents. A report called for these aspects to be taken into account, highlighting the high proportion of elderly and working-class people in the affected neighbourhoods. From 2005, a growing awareness of social vulnerability emerged. A contact person was appointed to support residents, but efforts were slow and limited. Residents' demands shifted from the cancellation of the "zone to be defended" to recognition and social support. The initial failure to take social vulnerabilities into account had negative consequences. The demands evolved towards recognition and social support, but the emergence of the concept of "landscape vulnerability" during rehabilitation shifted the focus from social inequalities to the preservation of the landscape, illustrating the predominance of landscape considerations over social aspects.



AULT, FRANCE

CONTEXT



Region: Somme, Hauts-de-France
Timeline: Spring 2022
Flood type: Coastal risk, cliff erosion
Nbr of households : 1431 residents

SOLUTIONS AND PROJECTIONS

The technical solutions proposed to deal with this risk of coastal erosion in Ault include various measures:

-Reducing Agricultural Runoff: Efforts are being made to reduce agricultural runoff by installing soft hydraulic infrastructure in agricultural fields. This aims to reduce erosion caused by runoff.

-Regulating urbanisation: The authorities are seeking to regulate urbanisation in order to prevent the construction of new properties on the seafront, thereby protecting sensitive areas from erosion. There is also a plan to relocate vulnerable populations.

-Actions for Adaptation to Climate Change: The document mentions actions to reduce the impact of erosion linked to climate change, including the protection of coastal areas and critical infrastructures.

-Protection and planning measures: Various measures are proposed to reinforce the stability of the shingle strip at Hable d'Ault and improve protection in other seaside resorts.

These solutions combine individual actions, collective initiatives and natural approaches to minimise the impact of coastal erosion and ensure the long-term resilience of the region in the face of these risks.

The involvement of residents varies, with some becoming actively involved in community action, while others express concern. There is also a section of the population that denies the risk and does not see the danger. The means of participation include formal consultations, public statements and access to administrative documents. A large proportion of the population complained of a lack of communication on the part of the decision-makers, with residents not being included in the project. So there is a lack of communication in this project, which is problematic.



CASE DESCRIPTION

Ault is a rural commune in the Somme region of Hauts-de-France, in northern France. It is a small coastal town with a strong tourist presence. The town's economy is based mainly on tourism, fishing and coastal activities. Ault faces natural risks such as coastal erosion due to rising sea levels and rainwater run-off from intensive agriculture upstream, which also presents an erosion risk. In addition to its economic activities, Ault is of environmental and heritage importance and is home to a diverse population, including long-term residents, new arrivals and tourists.

SOCIO-DEMOGRAPHY

Population overview

- Population: 1,431 inhabitants
- Surface area: 6 km²
- Population density: 238 inhabitants / km²
- Flooded area: ~600 households
- Average age: 51

VULNERABILITY

Coastal erosion risk management in Ault is governed by plans and programmes, with a move towards an observation-based approach to erosion.

The focus is on justice and inequalities, highlighting the socio-economic disparities between seaside and inland residents, which can lead to potential conflict.

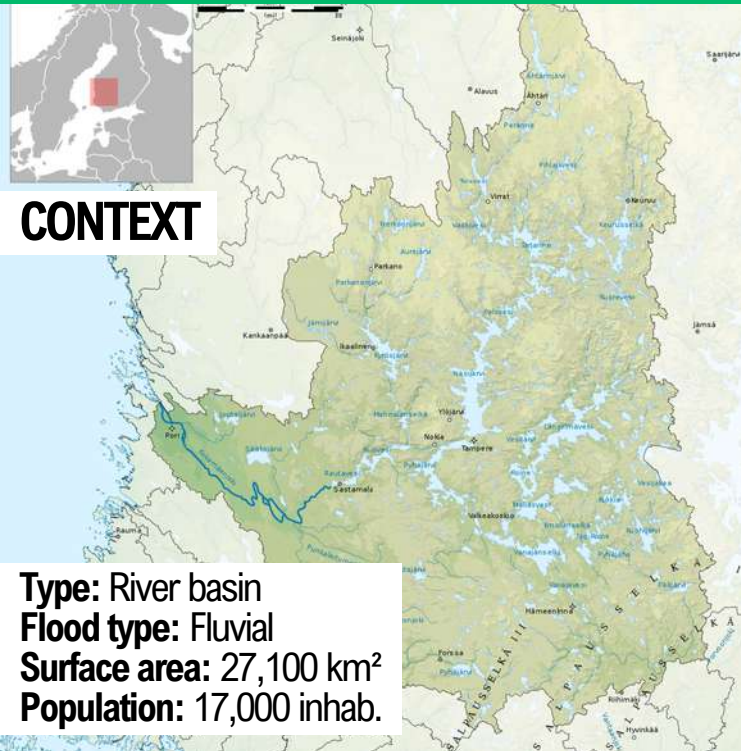
To address these issues, solutions such as increasing social housing are proposed to meet the needs of residents and reduce inequalities, with significant financial and social implications for the local population.

The lack of consideration for these aspects can be explained by the land pressure resulting from the demand for seafront properties, influencing local authority planning decisions. In addition, the focus on luxury properties may limit the extent to which attention is paid to the needs of the local population.



KOKEMÄENJOKI, FINLAND

GEOGRAPHIC CONTEXT



CONTEXT

Type: River basin
Flood type: Fluvial
Surface area: 27,100 km²
Population: 17,000 inhab.

SOCIO-DEMOGRAPHY

- Socio-economic context in Kokemäenjoki region reveals inequalities in flood risk management.
- Agriculture is vital but faces challenges from recent winter flooding.
- FRMPs acknowledge inequalities and climate change impact on flood damages.
- Current flood risk management leans towards a technocratic approach, lacking local stakeholder input.
- A more balanced approach with local participation and communication is needed.

VULNERABILITY

Vulnerability in the Kokemäenjoki region is tied to financial losses from flooding, particularly impacting farmers who depend on the river economically. Socio-spatial inequalities worsen as different areas are disproportionately affected. Current flood risk management, with its technocratic focus, perpetuates these disparities and lacks attention to social justice. Limited knowledge and awareness about climate change and flooding further heighten vulnerability. Public participation is restricted, especially for ordinary citizens lacking essential information. Local stakeholders advocate for better communication and increased participation to address flooding and socio-economic disparities.

The Kokemäenjoki region in Finland offers a unique geographical context for flood risk management. This area encompasses the extensive Kokemäenjoki river basin, known for its high level of regulation. Historically, the river management served several key purposes, including hydropower production, timber floating, flood defense, and water transportation. The regulation of the river has evolved significantly over the years, with practices such as dredging and terracing being prominent in the 1920s. This context extends into the 2016-2021 and 2022-2027 Flood Risk Management Plans (FRMPs), which continue to focus on mitigating significant flood risks in specific areas, notably Pori and Huittinen. These plans emphasize participatory development involving local and regional authorities, private stakeholders, and experts from various domains. The ELY Centre of Varsinais-Suomi coordinates these plans, with the ELY Centre of Pirkanmaa playing a crucial role in river management.



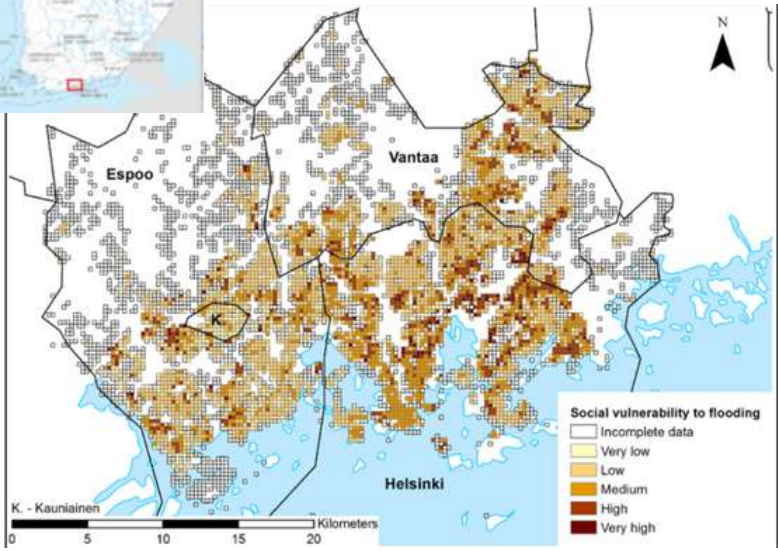
PROJECT PRESENTATION

The focus of the 2016-2021 and 2022-2027 FRMPs is the Kokemäenjoki river's regulation in response to the escalating threat of winter floods. The central element of this flood risk management project is the Säpilänniemi adjustment channel, designed to alleviate flood risks in the Huittinen region and across the entire river basin. However, this project has sparked concerns regarding its potential environmental impacts, particularly within the Natura 2000 areas. It is essential to recognize that flood risk management in the Kokemäenjoki region is a complex network of both public and private stakeholders. Public authorities and entities, such as power companies, regional experts, municipalities, and rescue services, are extensively involved, contributing to the intricate nature of the flood risk management landscape.

Does vulnerability to flood risks encompass an issue of equity?

CONTEXT

Social vulnerability to flooding in the Helsinki Metropolitan Area based on an analysis carried out by Kazmierczak (2015) at the Helsinki Region Environmental Services.



Municipalities: Helsinki, Espoo, Vantaa, Kauniainen

Timeline: Spring 2022

Flood type: Coastal, fluvial & pluvial

The Helsinki metropolitan area is a coastal attractive urban area housing a great diversity of population and a high number of infrastructures. The coastal area of Helsinki and Espoo is considered one of the 5 coastal flood risk areas in Finland, although the area has been little affected by flooding until today. In addition to this risk of coastal flooding, there is an occasional risk of fluvial flooding and a risk of pluvial flooding in the HMA. The rise in this latter risk, linked to climate change, urban development and population growth, weighs on municipalities. This risk is in fact managed at the local scale and horizontal coordination between multiple stakeholders is weaker than for the coastal flood management plan (regional scale). Besides, existing Flood Risk Management Plan (FRMPs) suffer from neglecting social aspects due to a variable vision of vulnerability depending on the actors and political sectors, lack of citizen participation, inflexibility, and excessive technical focus, making them unsuitable for comprehensive flood risk management. It is therefore necessary to propose new equitable forms of management that better respond to the diversity of populations, their capacities and their vulnerabilities.

SOCIO-DEMOGRAPHY

Population overview:

- Population: 1,2 million inhab.
- Surface area: 3,697 km²
- Population density in HMA: 325 inhab. / km²
- Population density in Helsinki: 3,139 inhab. / km²
- Flooded area: 3200 inhab. in direct risk
- Average age: 40

Population diversity:

- 16,6% of residents of foreign citizens in Helsinki
- 14% of residents over 65
- 2000 homeless people



VULNERABILITY

In the Helsinki region, vulnerability manifests in three ways:

1. Diversity by socio-economic category: Given the region's attractiveness, there exists a range of vulnerable populations requiring distinct adaptations during floods. This includes foreigners (constituting 11% of the population), individuals in precarious situations (such as 2,000 homeless people), and the elderly.
2. Spatial Vulnerability: Notably, 3,200 residents inhabit flood-prone zones, introducing a spatial dimension that complicates effective flood management.
3. Property vulnerability: This form of vulnerability considers potential damage to material assets, especially housing, industrial facilities, and underground infrastructures.

In this case study, current FRMPs predominantly concentrate on material aspects and property protection, neglecting specific vulnerable populations. Also, the knowledge gap reinforces vulnerability in terms of preparedness and adaptation.

INVOLVEMENT AND OBSTACLES

The authorities promote a participation network, when in reality many citizens and organizations are not aware of these participation possibilities. The result is a low participation, in addition to unknown effectiveness in taking citizens' points of view into account in flood risk management. Citizens' low awareness of risks is mainly due to a lack of accessibility to information and high confidence in the authorities for flood risk management. Citizens are then often not aware of their own responsibilities. This is in clear contradiction with the authorities' objective of emphasizing the responsibility of citizens in personal preparation and residual risk management. Furthermore, the effectiveness of the risk management system is contested by certain organizations, particularly social ones, since the system does not seem to protect the most vulnerable people.

WEST SUSSEX, ENGLAND

CONTEXT

Chichester District (Manhood Peninsula) and **Arun District** (Bognor Regis)

Flood type: Coastal, fluvial & pluvial



SOCIO-DEMOGRAPHY

Population overview:

- Population : 858 852 (2018)
- Surface area : 1 991 km²
- Chichester :
 - 15 to 44 years old: 32,2%
 - Over 65: 24,4%
- Chichester: A mix of family households and retirees, with a higher-than-average older population.
- Arun: Similar to Chichester, a mix of families and a notable proportion of older residents.

Vulnerability:

- Both areas have a higher-than-average elderly population

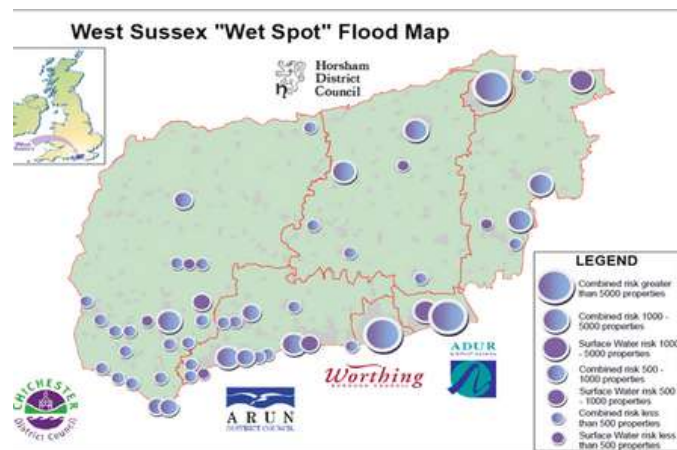
VULNERABILITY

This region is marked by several inherent risk factors, including the Arun River, abundant wetlands, as well as the susceptibility to Soakout and Dolines phenomena due to the soft and chalky geological composition. Furthermore, coastal erosion poses a significant threat, exacerbated by the generally flat terrain of West Sussex.

Contrastingly, the existence of the South Down Park and regulatory frameworks such as ZPS, ZSC, RAMSAR, and SSSI actively constrain urban expansion, concentrating populations within delimited areas. This, however, intensifies the pressure on regions already at risk, amplifying the challenges associated with potential hazards.

CASE DESCRIPTION

Historically, the region of West Sussex has grappled with recurrent flooding episodes. Despite the implementation of various flood protection measures, their efficacy remains questionable. These measures encompass the drilling of holes for water drainage, imposing stringent restrictions on residential constructions, the installation of wooden structures engineered to amass sediment for enhanced protection, the utilization of rock armor composed of sizable boulders to fortify shorelines, and the erection of sea walls. Additionally, for addressing coastal erosion, strategies such as groins, riprap, and dykes have been deployed in an effort to mitigate the impacts over time.



POPULATION INVOLVEMENT

Owners bear the responsibility for flood risk management, regardless of financial or technical capabilities, as governance is not a determining factor. The flexible powers in flood risk management allow various stakeholders to act if inclined.

The study identifies a lack of risk information from owners, revealing a gap in awareness. Additionally, it notes an unfair distribution of funds in Flood and Coastal Erosion Risk Management (FCERM).

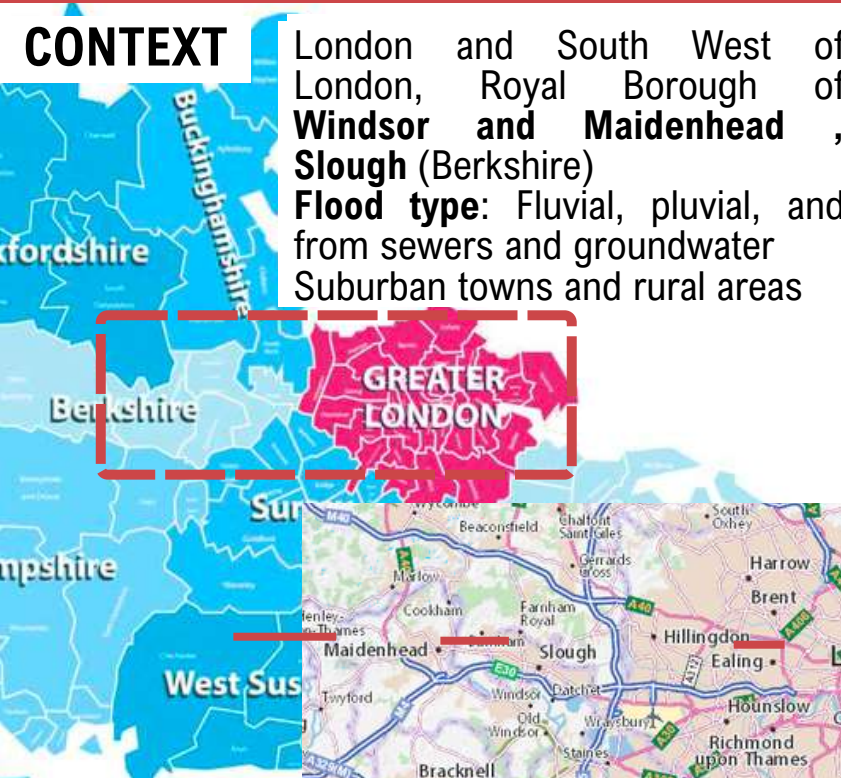
Does vulnerability to flood risks encompass an issue of equity?

THE RIVER THAMES, ENGLAND

CONTEXT

London and South West of London, Royal Borough of **Windsor and Maidenhead**, **Slough** (Berkshire)

Flood type: Fluvial, pluvial, and from sewers and groundwater
Suburban towns and rural areas



CASE DESCRIPTION

The River Thames area faces a "Very High Risk" of flooding from tidal, fluvial, surface water, sewer, and groundwater sources. Implemented strategies include the Jubilee River, the River Thames Scheme, channel fixes, gate installations, deepening specific areas, and utilizing lakes for water management.

Nature-based solutions involve creating new channels, enhancing habitats, and replacing agricultural land. Special projects like Slough Pathfinder and Sponge City contribute to flood relief efforts in the River Thames region.

SOCIO-DEMOGRAPHY

Population overview:

- Population: 15 million
- Major active age group: 16 to 64 years old
- Households:
 - **Windsor and Maidenhead** 62,2% aged 16-64 ; Mix of family households, single-person households, and retirees
 - **Slough** 62,2% aged 16-64 ; 29% under 19 ; Diverse household composition

Vulnerability:

Windsor and Maidenhead: Pockets of vulnerability, especially among the elderly.

Slough: Diverse ethnic and socio-economic vulnerabilities. Unique risks due to a younger population.

VULNERABILITY

The project seeks to safeguard 11,000 homes and 1,600 businesses from flooding. In Slough, 5.2% receive social benefits, exceeding the national average of 3.7%. Despite overall prosperity, Windsor and Maidenhead have pockets of vulnerable populations, particularly among older residents. Slough, renowned for its cultural diversity, encompasses various ethnic and socio-economic groups that may face potential vulnerabilities, with a younger population indicating unique risks.



POPULATION INVOLVEMENT

Current efforts in flood protection fall short. Various stakeholders, including the community, SBC, Buckinghamshire Council, Wildfowl and Wetlands Trust, and the National Flood Forum, contribute to the Flood and Coastal Resilience Innovation Fund. Engaging the community, the Slough Pathfinder, and Sponge City projects are integral. Partnership funding since 2011 has played a pivotal role in shaping flood policies in the Lower Thames region.

Does vulnerability to flood risks encompass an issue of equity?