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Establishing a Flood-Proof District in Bilbao, Spain

Public-Private Partnerships to adapt to floods of a Former Industrial Peninsula

The Zorrotzaurre district in Bilbao, Spain, is transforming a flood-prone industrial site into a climate-resilient residential area through a Public-Private Partnership, combining flood protection with urban revitalisation.

Key Learnings

- **Collaborative Financing**: A balanced financial model, in which public stakeholders (51%) and private developers (49%) collaborate on infrastructure costs, ensures shared responsibilities and investment.
- **Innovative Flood Protection**: The project integrates engineered flood protection (e.g. canal expansion and floodwalls) with nature-based solutions (e.g. parks and permeable surfaces), creating a more adaptive and resilient system. This holistic approach mitigates flood risks and improves biodiversity, urban liveability, and long-term climate resilience.
- **Community Engagement**: Residents actively participated in shaping green spaces and preserving historic buildings, ensuring social buy-in and cultural continuity. Public consultations influenced key planning decisions, leading to greater inclusivity and public support.

About the region

Bilbao, located in northern Spain, is a city shaped by its proximity to the Nerbioi River and the Atlantic Ocean. With a population of 346,746 (2025), the city's redevelopment efforts aim to address climate risks while accommodating urban growth. The region faces increasing climate risks, particularly from urban flooding exacerbated by extreme weather events and sea level rise. The Zorrotzaurre district was historically an industrial peninsula but has become increasingly vulnerable to flooding and disuse, reducing its economic output.

Climate Hazards

Flooding, Sea Level Rise

Sector

Water Management

Key system

Critical Infrastructure, Water Management

Figure 1: Location Bilbao. Image Credit: cdn.britannica.com.

Climate Threats

River and coastal flooding significantly threaten Bilbao, as historical land use changes have increased runoff, increasing flood risks. The projected sea level rise associated with climate change could further exacerbate the situation, potentially undermining existing flood protection measures. Additionally, the Zorrotzaurre district has suffered from industrial decline, leading to urban degradation that required redevelopment to improve climate resilience and liveability in the city.

Innovative Flood Protection Measures, Increasing Climate Resilience

In 2012, landowners who formed the **Comisión Gestora de Zorrotzaurre**, a hybrid body balancing public and private interests, initiated the **Zorrotzaurre redevelopment Project** to develop the area. Due to the project's significance and the high proportion of publicly owned land (Port Authority, City of Bilbao, Provincial Government), the public sector joined the initiative, establishing a Public-Private Partnership. The official implementation began in 2014, following the approval of the original development plan in 2007.

On-the-ground flood protection measures taken

- One of the most significant interventions involved opening the Deusto Canal, which transformed the peninsula into an island, improving water flow and reducing flood risks. By breaking the land barrier, this measure allows for better water circulation and mitigates extreme flood events.
- Another ongoing strategy is raising the ground levels throughout the district. By elevating the land by up to 1.5 meters, the project ensures that new construction is more resilient against rising water levels and extreme weather conditions.

- The project team decided to build flood protection walls at critical points where Nature-based Solutions were impossible due to settlement developments.
- Stormwater tanks enhance the district's drainage capacity. These tanks collect and store excess rainwater, preventing overflow and reducing the risk of sudden floods during heavy rains. They also provide water during scarcity.
- Green spaces with parks, tree-lined pathways, and pedestrian-friendly zones serve as natural flood buffers, providing retention areas and absorbing excess water. The transformation aligns with regional strategies like the Basque Climate Change Strategy 2050 and national frameworks for sustainable development.

Figure 2: Zorrotzaurre Flood Proof district. Image Credit: Comisión Gestora de Zorrotzaurre.

Collaborative Financing

The project's total investment is about €30 million, with €20.9 million allocated to opening the Deusto Canal and €5.1 million for protecting settlements. Public actors, including Bilbao City Council and the Basque Water Agency (URA) provided regulatory oversight and public funds from regional budgets supported by the European Regional Development Fund (ERDF) and covered 51% of costs. Private developers financed the remaining 49% through land-based contributions. The Public-Private Partnership structure distributes financial and operational risks, leveraging private sector efficiency for infrastructure delivery. This model ensures long-term sustainability while aligning with urban development goals, such as creating 5,473 homes and 202,129 m² of commercial space, providing economic benefits to the area.

Community Engagement

Community engagement was crucial in the Zorrotzaurre project to ensure social acceptance and cultural continuity. Through public consultations, residents raised their concerns, which led to adjustments in the development plan, such as preserving historic buildings for cultural purposes.

In addition, the municipality specifically integrated the Surbisa (Society for Community Restoration), a municipal initiative of the city of Bilbao, into the financing mechanism to offer owners and tenants financial support for refurbishing existing buildings. The programme focused on energy efficiency, accessibility and sustainable renovation, such as preserving the historic Papelera building. The city and the project developers equally financed the funding programme, thereby promoting social justice and inclusive urban development. The active participation of the citizens and the targeted support from Surbisa strengthened the neighbourhood's identity and contributed to the long-term acceptance of the project.

Outcomes and Lessons Learned

The transformation of the canal and the construction of the bridges connecting the island with the mainland can be seen as significant successes. These measures, as well as raising the ground level, are expected to reduce flood-related damage by up to 60 per cent.

However, challenges persist, such as delays in completing stormwater tanks and green infrastructure and current flood prediction models excluding sea-level rise from calculations. Despite engagement, equity gaps remain, as residents lack formal decision-making power in the Public-Private Partnership. Recommendations include integrating dynamic climate projections, strengthening community representation in governance, and securing phased funding to avoid implementation delays.

> *"[With Zorrotzaurre's Technology District] Our young people have a place here to prepare, work and also live. An innovative model that is a driving force",*
>
> *Juan Mari Aburto, Mayor of Bilbao, 2022*

Recommendations for setting up a Private-Public Partnership

This case shows that private landowners initiated the Private-Public Partnership, highlighting the importance of private sector involvement from the start of a project and of setting up a coordinating body, such as the Comisión Gestora de Zorrotzaurre, which should include representatives from both the public and the private sector actors.

Engaging local residents and community organisations in the planning process is also of great value. The blended finance structure (with contributions from public and private sources) can also be adapted to other contexts, especially where high upfront costs and technical expertise are required.

Summary

The Zorrotzaurre redevelopment project in Bilbao, Spain, applies a private-public partnership model to reduce climate-related flood risks. Led by The Comisión Gestora de Zorrotzaurre, a mixed non-profit organisation overseeing the partnership, it balances public oversight with private sector efficiency, enabling joint decision-making on flood protection, land elevation and green infrastructure.

Since 2012, the project has transformed an industrial peninsula into a flood-resistant residential area. Funding is based on land ownership, with 51% public and 49% private investment. Public funds have been directed towards flood protection infrastructure, such as the Deusto Canal, while private developers invested in land elevation and green spaces.

This initiative highlights the potential for effectively combining public and private funding to address urban challenges such as climate change and flooding.

Further information

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- https://climate-adapt.eea.europa.eu/en/metadata/case-studies/public-private-partnership-for-a-new-flood-proof-district-in-bilbao
- https://interlace-hub.com/public-private-partnership-redevelop-zorrotzaurre-district-bilbao
- https://zenodo.org/records/13836766

Contact

https://www.zorrotzaurre.com/en/

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