



**Regions
4Climate**

Basque Country Spain



**Funded by
the European Union**

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Location: South of Europe, at the eastern end of the Bay of Biscay. The demonstration site is the Bay of Txingudi, also known as Bidasoa estuary that is cross-border with France.

Population: 2.2 million

Area: 7,234 km²

Population density: 304 inhabitants/km²





Region-important activities

- Fisheries
- Livestock production
- Agriculture
- Manufacturing industry

Main climate challenges



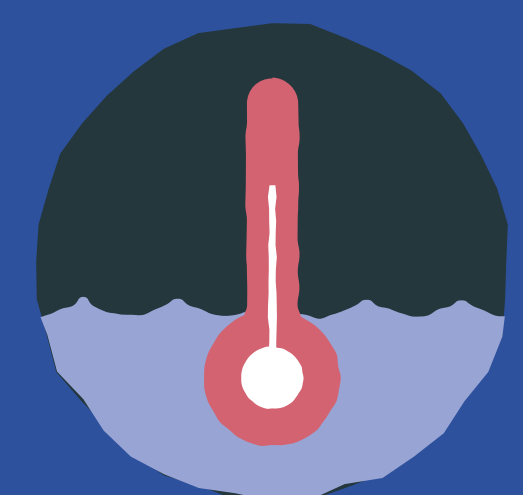
Sea level rise



Coastal erosion



Storm surge



Ocean warming

Stakeholders: Mapping, selection, & engagement

- **Local level:** Identifying methods in which social perceptions can be addressed or integrated into future planning strategies or adaptation measures
- **Regional level:** Group of Nature Based Solutions for adaptation, composed of all the stakeholders of the NBS value chain in the Basque Country. Basque Government departments, municipalities, architecture studios, engineering companies, RTOs, clusters and NBS suppliers.

The region is committed to:

The Director of Natural Heritage and Adaptation to Climate Change of the Basque Government, Adolfo Uriarte, and representatives from AZTI, Ihobe, Tecnalia, Euskalmet and Zabala visited Plaiaundi saltmarshes as part of the European project Regions4Climate and the EU Climate Change Adaptation Mission, where the Basque Country is working with a dozen European regions on innovative solutions for climate resilience. Within the Basque pilot, two main actions are being implemented: the recovery of several marsh areas in the Txingudi Bay and the deployment of the Basque Climate Change Adaptation Mission.

Video: [Regions4Climate starts in the Basque Country with the recovery of the Plaiaundi marshes in Txingudi](#)



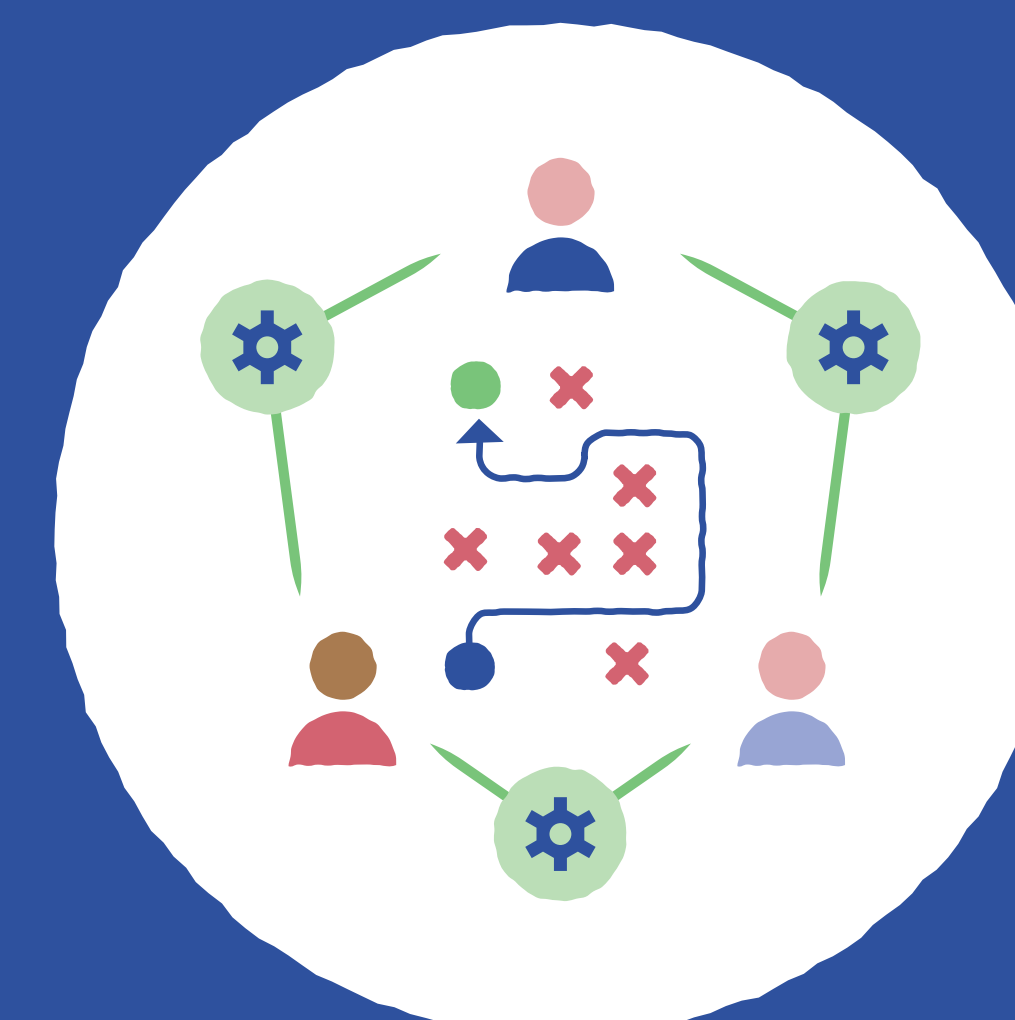
Restoring estuarine dynamics



Reconnecting marsh and wetland areas



Evaluating the impacts of restoration



Strengthening and adapting governance and planning structures

From Estuarine Restoration to Climate Resilience in the Basque Coast

The Regions4Climate project in the Bidasoa estuary (Txingudi Bay, Basque Country) demonstrates how nature-based solutions, cross-border cooperation, and integrated governance can enhance climate resilience and blue carbon ecosystems. Key actions include ongoing restoration of saltmarshes in Plaiaundi–San Lorenzo (with tidal reconnection and planned dike and soil removal over 5.5 ha) and completed works in Jaizubia (2.5 ha), improving hydrodynamics, biodiversity, and flood resilience within a Natura 2000 site. These interventions are supported by complementary measures such as eco-grazing and seagrass restoration, alongside a comprehensive monitoring system using drones, sensors, and modelling tools to track environmental change and support risk forecasting. At governance level, the project develops climate adaptation planning tools, financing strategies, and stakeholder engagement processes, providing a replicable model for resilient coastal management.



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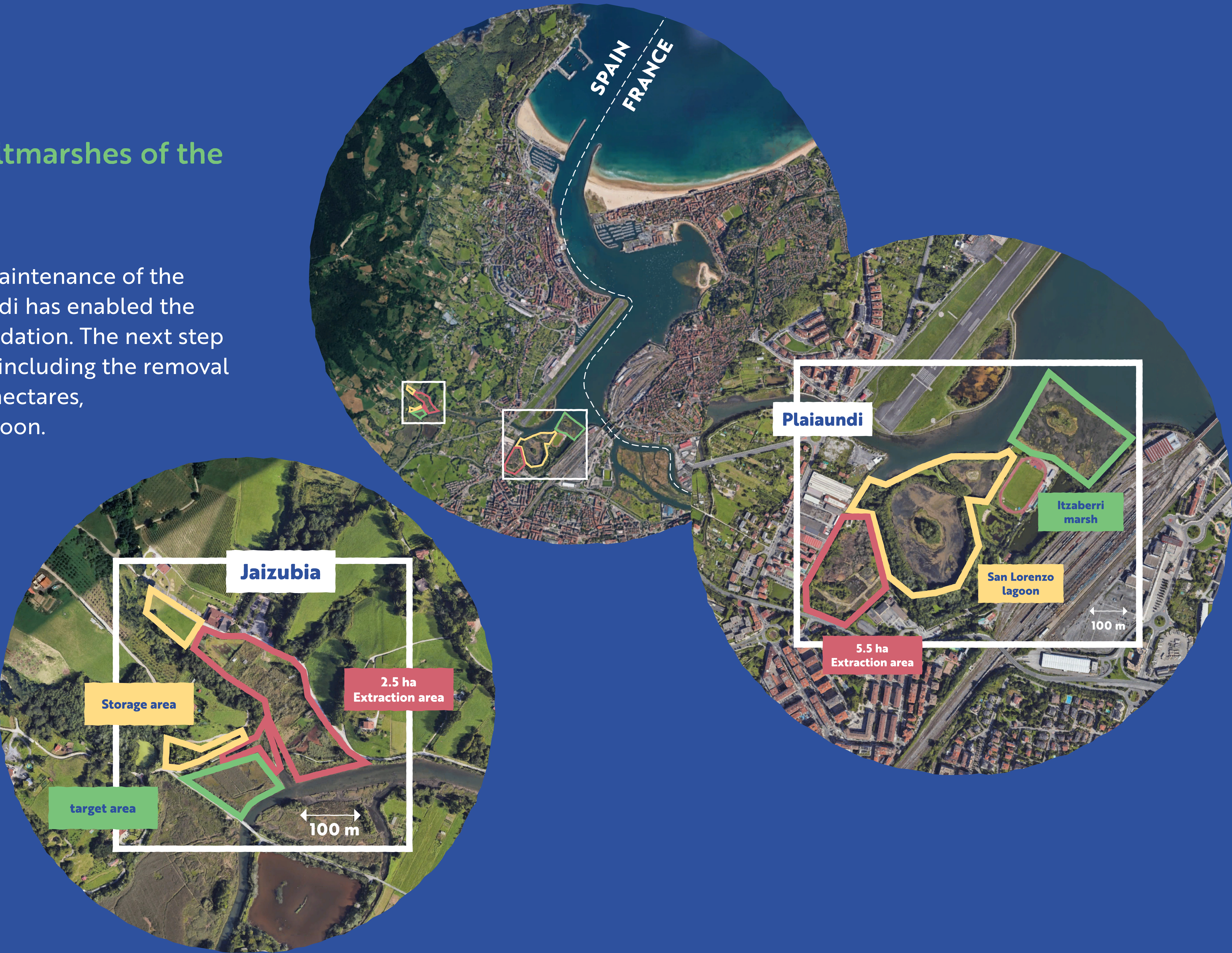
A Basque partner contribution to Uhinak, the International conference on climate and coastal change held every two years in Ficoba, Irun.

Project activities

1. Environmental recovery of the saltmarshes of the Bidasoa estuary (Txingudi bay)

During the Regions4Climate period, the lack of maintenance of the tidal flaps following land expropriation in Plaiaundi has enabled the progressive re-establishment of natural tidal inundation. The next step will involve interventions by national authorities, including the removal of dikes and agricultural soils over an area of 5.5 hectares, and reconnecting this area to the San Lorenzo lagoon.

In parallel, the provincial authorities of Gipuzkoa have finalized the restoration of 2.5 hectares of saltmarsh in Jaizubia.



2. Local scale monitoring program

A comprehensive monitoring programme has been established to assess the impacts of estuarine restoration by creating a robust pre-intervention baseline and tracking physical and ecological changes over time. It combines autonomous in situ systems (including solar-powered videometry, radar tidal gauges, and sediment elevation measurements), extensive field surveys (bathymetry, topography, drone LiDAR, multispectral imaging, and biodiversity assessments), and advanced numerical modelling (hydrodynamics, flooding, storm surge, and long-term morphological simulations). Together, these tools enable continuous observation, scenario analysis, and evaluation of restoration effectiveness, while supporting adaptive management and cross-border data sharing for blue carbon and climate resilience in the Bidasoa estuary.

Field survey

1. Ecological survey
2. Bird counting
3. Species samples
4. Bathymetric survey
5. Topographic survey

Instrumentation

1. Tidal gauges
2. Surface Elevation Table (SET)
2. Current meter
4. Obscape videometry
5. Kostasystem videometry



3. Monitoring programme at regional level

A coastal monitoring programme for extreme events and long-term changes running at regional up to cross-border scale started. It encompasses monitoring actions outside Txingudi as for example the extension of the KOSTASystem videometry network across the Spanish-French border. The Basque Region partners then contribute to the monitoring actions of the South Aquitaine Region. Two stations are now operational in St Jean de Luz and Erromardie. Typical applications of KOSTASystem that are used in R4C are to track overtopping and flooding during extreme events (from instantaneous Timestack images) and monitoring long-term morphological changes through the shoreline evolution analysis of monthly images.

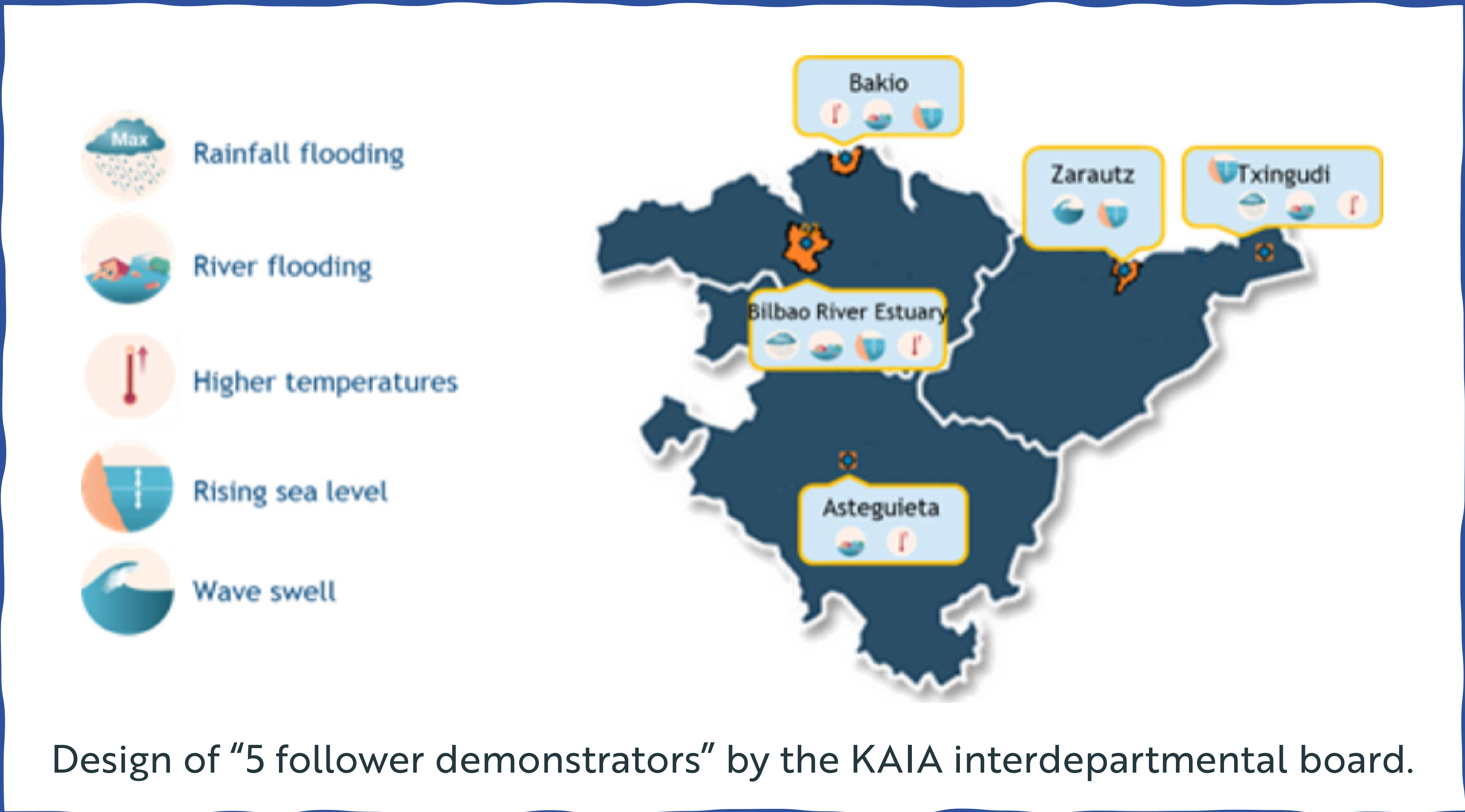
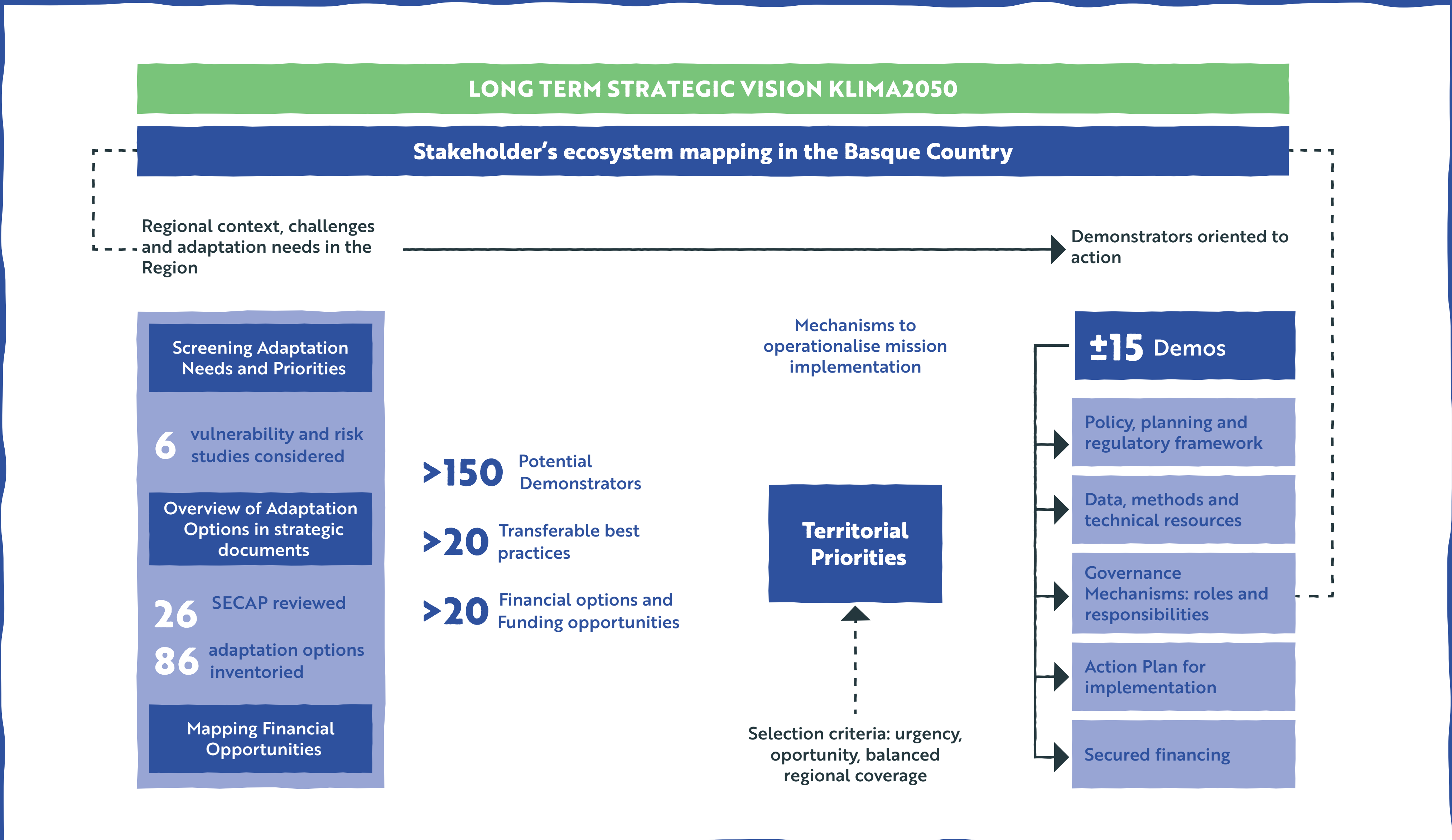


4. Policy for transformative adaptation to climate in the region: multisector and multiscale planning for resilience

The Basque Country is advancing a transformative, multisectoral approach to climate adaptation by strengthening governance, coordination, and planning across scales to accelerate implementation on the ground. Aligned with the Basque Climate Change Adaptation Strategy 2030, the Roadmap 2050, and the European Mission on Adaptation, the work focuses on turning strategic goals into concrete actions. A detailed policy and regulatory assessment has identified key barriers and opportunities, leading to improved coordination mechanisms and more effective financial and operational tools.

Building on this, a mission-oriented adaptation framework has been co-developed with regional stakeholders, supported by a practical methodology that guides the process from risk identification to solution design and implementation. This includes a structured three-phase approach (needs assessment, identification of demonstrators, and development of actionable projects), supported by a portfolio of best practices and an evolving atlas of solutions.

A central element is the use of “demonstrators” as scalable, measurable, real-world adaptation projects that address multiple climate risks and support learning and replication. Combined with targeted financing mechanisms and strong institutional coordination, this approach is helping move the Basque Country from planning to implementation, accelerating the delivery of tangible climate resilience outcomes.



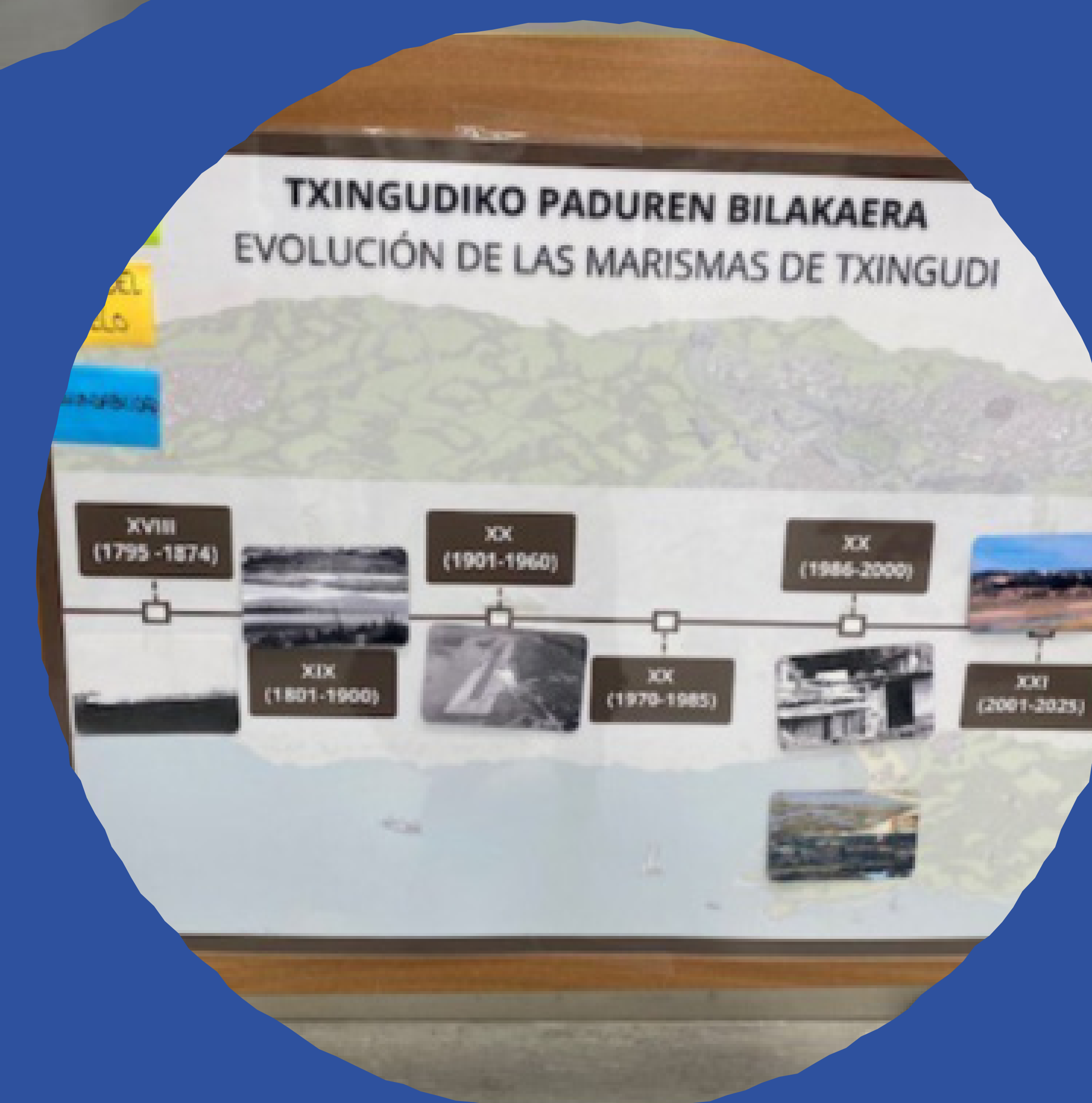
Design of “5 follower demonstrators” by the KAIA interdepartmental board.

5. Improved governance and stakeholder engagement to enhance financing opportunities and move them into action

Turning climate adaptation plans into real investments requires governance, coordination, and active stakeholder engagement. In the Basque Country, Regions4Climate has strengthened this enabling environment by improving institutional collaboration and local participation. At regional level, the creation of the KAIA interdepartmental board supports coordination across government departments and public agencies, helping align priorities and accelerate implementation. Work is also underway to connect adaptation projects with funding opportunities through a dynamic financing database and a co-developed demonstrator atlas that links project ideas with suitable European and national funds.

At local level, the Txingudi pilot area has focused on inclusive engagement through collaboration with Ekoetxea Txingudi, using participatory “active listening” methods to involve citizens in shaping adaptation scenarios. Special attention has been given to vulnerable groups, ensuring accessible and meaningful participation. Workshops have helped translate restoration and adaptation measures into tangible social and environmental benefits, while building awareness and feedback for future actions.

Overall, this combined governance and community approach is helping bridge the gap between planning and implementation, mobilising funding, and ensuring climate adaptation is both actionable and socially supported.



Advances on regional innovations

- **Societal:** First set of social perception and just transition indicators defined and baseline measurement.
- **Environmental:** Baseline information for the monitoring of restoration actions.
- **Governance:** Interdepartmental Climate Change Adaptation Board composed by different Basque Government departments.



Achievement and value

1. Continuous presence of guards ensure ecological survey and public management
2. Spontaneous development of Salicornia species following the reintroduction of tidal inundation in formerly reclaimed areas
3. Implementation of a monitoring programme in Txingudi to assess blue carbon sequestration and climate adaptation
4. Onset of the regional coastal monitoring programme
5. Advancement of the Mission on Adaptation through demonstrators and strategic planning
6. Establishment of the KAIA interdepartmental coordination board and development of public engagement activities

Regional contact points

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Partners

