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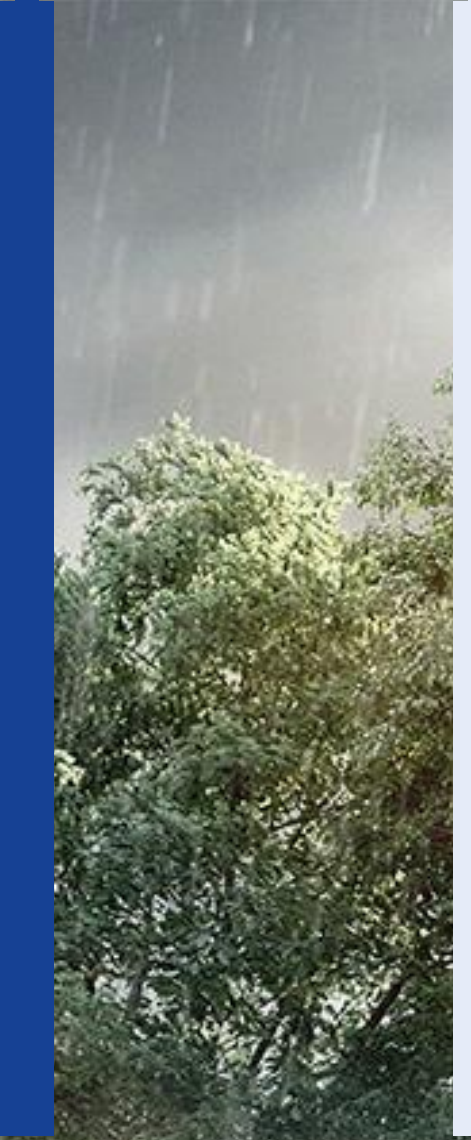

FINAL REPORT

Vulnerability, Resilience and Recovery Policies of the physical living environment

(VREPO)

Final report // November 2025

This FINAL Report is conducted within the framework of the ESPON 2030 Cooperation Programme, partly financed by the European Regional Development Fund.

The ESPON EGTC is the Single Beneficiary of the ESPON 2030 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway and Switzerland.

This delivery does not necessarily reflect the opinions of members of the ESPON 2030 Monitoring Committee.

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Information on ESPON and its projects can be found at www.espon.eu.
The website provides the possibility to download and examine the most recent documents produced by finalised and ongoing ESPON projects.

ISBN: 978-2-919839-06-3

Layout and graphic design by BGRAPHIC, Denmark

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Disclaimer

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Abbreviations

This list excludes abbreviations related to specific projects and national or subnational entities, as these are explained directly within the report.

API	Application Programming Interface
CBRNe	Chemical, Biological, Radiological, Nuclear, and Explosive
CRS	Coordinate Reference System
CORINE	Coordination of Information on the Environment
DMC	Disaster Management Cycle
ECTP-CEU	European Council of Town Planners
EEA	European Environment Agency
EU	European Union
GIS	Geographical Information System
JRC	Joint Research Centre
KPI	Key Performance Indicator
LAU	Local Administrative Units
MCA	Multi-Criteria Assessment
NUTS	Nomenclature of territorial units for statistics
OSM	OpenStreetMap
PACA	Provence-Alpes-Côte d'Azur
SDI	Spatial data infrastructure
TOR	Terms of reference
VMM	Vlaamse Milieumaatschappij
VREPO	Vulnerability, Resilience and Recovery Policies of the physical living environment
WFS	Web Feature Service

Country Codes

BE	Belgium
FR	France
LT	Lithuania
MT	Malta
NL	Netherlands

Governance Levels

LOC	Local
NAT	National
REG	Regional

Vocabulary

TERMS	DEFINITION IN THE FRAMEWORK OF THE ESPON VREPO PROJECT
Capacity	The existing strengths, skills, and resources a group or society has, to handle and reduce disaster risks. This includes physical infrastructure, institutional systems, knowledge and expertise, social networks, and governance structures.
Disaster Management Cycle (DMC) [1]	A continuous process comprising four key phases - Mitigation, Preparedness, Response, and Recovery. These four stages are designed to manage disaster risk effectively at all stages, from reducing potential impacts, providing effective emergency responses, and support long-term recovery efforts to rebuild and improve communities, infrastructure, and systems in a sustainable and resilient manner. Examples of relevant systems include neighbourhood flood response groups (social domain), seagrass restoration for coastal resilience (ecological domain), and hydrological forecasting systems for river basins (technological domain).
Exposure	The presence of people, buildings, infrastructure, economic assets and natural resources in areas that are susceptible to hazards.
Hazard	A potential natural or human-caused harmful event, phenomenon or activity that can cause injury, loss of life, damage to property, or harm to the environment. Hazards can be sudden shocks (e.g., earthquakes) or long-term stresses (e.g., droughts).
	Actions to reduce risks and vulnerabilities before disasters happen. Examples include hazard assessments, early warning systems, strengthening infrastructure, restoring wetlands, promoting sustainable land use practices and retrofitting buildings.
Preparedness	The planning and implementation of measures to ensure readiness for disasters. This includes activities such as community training, developing and testing real-time monitoring and early warning systems, creating and practising response plans, and ensuring resources are in place to respond effectively.
Response	Immediate actions taken during and shortly after a hazard to save lives, protect property and minimise harm. Such activities include rescue operations, emergency medical care, evacuation, and the provision of critical information through effective communication systems.
Recovery	Efforts to rebuild, restore and improve communities, infrastructure and systems after a hazard, focusing on stronger, more resilient and sustainable systems to better withstand future disasters. Examples of relevant systems applied to recovery include community-led housing reconstruction initiatives (social domain), wetland restoration to mitigate flooding risks (ecological domain), and smart grid technologies for energy infrastructure (technological domain).

[1] In climate and spatial planning practice, "mitigation" typically refers to actions that reduce greenhouse gas emissions, while "adaptation" refers to spatial, infrastructural and governance measures that enable territories to function under unavoidable climate impacts (e.g. flood-resilient zoning, cooling corridors). In this TA, we apply terminology from European disaster risk management and resilience policy, which organises recommendations into Mitigation, Preparedness, Response and Recovery. Hence, although the word "adaptation" does not appear as a standalone stage in our four-phase cycle, its substance is woven into our Mitigation, Preparedness and Recovery stages.

Resilience	The ability of systems (social, ecological, and technological) to anticipate, absorb, recover from, and adapt to hazards while maintaining or improving their essential functions.
Risk	The probability of a hazard causing harm to people, property, or the environment. It is determined by the interaction of three key components: the hazard itself (including its frequency, intensity or probability of occurring), the level of exposure to the hazard and the vulnerability of the affected system (capacity to cope vs susceptibility). This relationship is often expressed as: Risk = Hazard × Exposure × Vulnerability

Example: Flood Risk in a Coastal Town

- **Hazard**: A 3-meter storm surge.
- **Exposure**: 10,000 residents, buildings and roads and essential infrastructure located in the hazard zone.
- **Vulnerability**: Weak flood defences, poorly constructed buildings, and the absence of an early warning system.

If a hazard occurs where vulnerable people or structures are exposed, the risk is higher.

Susceptibility	How likely people, infrastructure, or the environment are to be harmed by hazards due to weaknesses (e.g. fragile ecosystems, poor construction, high proportion of disadvantaged groups) or lack of preparedness (e.g. no evacuation plans or drills in flood prone areas, lack of functional early warning systems, poor coordination between local agencies during emergencies).
Vulnerability	The degree to which people, infrastructure, or the environment are likely to be harmed by a hazard. It reflects the potential for damage based on weaknesses and the lack of protective measures or preparedness. In simple terms, vulnerability can be expressed as a balance between susceptibility (how likely harm is) and capacity (the ability to cope or reduce harm): Vulnerability = Susceptibility/Capacity.

Executive Summary

Europe is facing several challenges to its physical living environment. The challenges and hazards faced can vary across the continent. The VREPO project (Vulnerability, Resilience and Recovery Policies of the Physical Living Environment) was conducted between September 2024 and August 2025 under the ESPON 2030 programme. It explored how five European territories—Flanders (Belgium), Région SUD (France), Lithuania, Enschede (Netherlands), and Malta—assess vulnerabilities in their living environments and develop resilience and recovery strategies to address climate change, natural hazards, and socio-economic shocks in order to identify the best suited place-based approaches for developing resilience strategies.

To adequately respond and plan for disrupting events a clear understanding on how to develop robust place based resilience-oriented policies is needed. These insights can benefit policy makers across the whole of Europe. To address this, this study combined both scientific evidence with insights obtained from stakeholder engagement.

The Targeted Analysis has a double aim:

• Firstly, policy resilience strategies can be scientifically based on **evidence** regarding the vulnerability of the living environment of a region, in comparison with other (similar or dissimilar) regions: analyses and indicators are essential tools. Policy makers should be aware of the specific degree of resilience of their region, compared to other (similar or dissimilar) regions, in order to set priorities on the weakest characteristics of their region. It therefore becomes clear what are the place-based approaches best suited for a certain territory. The evidence focusses on a limited set of vulnerabilities linked to calamities in the 'physical living environment'.

• Secondly, **policy resilience strategies** need to be developed for mitigiation, preparedness, response, and especially recovery to a more resilient physical living environment in the post- and precalamity phase. These strategies should cover territorial content, governance and instruments. They have to be based on numerous sources (the scientific evidence, peer learning of mitigation practices in other regions, academic insights, international frameworks …). Strategies can focus on a more resilient situation after a crisis or calamity has struck the physical living environment but should also be well embedded in the disaster management cycle.

The project was guided by two primary policy questions:

- **PQ1 – What methodological framework and indicators can build solid evidence of vulnerability and resilience in regional living environments, and how can this evidence inform place-based strategies?**
- **PQ2 – How effective are existing strategies and instruments in managing crises, and what good practices can be identified across the Disaster Management Cycle (DMC)?**

Complementary questions addressed governance arrangements, actor roles, and opportunities for integrating government, private sector, and civil society perspectives in resilience planning.

Results

The VREPO analysis revealed both common challenges and territory-specific vulnerabilities, offering cross-regional insights into risks, policy gaps, and resilience capacities.

The project demonstrated that European territories face both shared and unique vulnerabilities across climate, socio-economic, and geopolitical dimensions. **Flooding, heat stress, and droughts emerged as critical risks** in all five regions, while Lithuania and Malta highlighted the growing importance of geopolitical instability and resource dependence.

There are several territorial differences:

- **Flanders (BE):** flooding and heat stress linked to dense urbanisation.
- **Région SUD Provence – Alpes – Côte d'Azur (FR):** recurrent droughts, wildfires, coastal flooding.
- **Lithuania (LT):** dual exposure to climate hazards and geopolitical tensions.
- **Enschede (NL)**: localised flood and urban planning challenges.
- **Malta (MT):** acute water scarcity, energy dependency, and coastal erosion.

The policy assessment confirmed that most strategies are concentrated in **mitigation and preparedness**, with limited attention to **recovery-oriented measures**, leaving a gap in "building back better" approaches. Stakeholder engagement exercises, combined with indicator-based spatial analysis, provided both territorial specificity and cross-regional comparability, ensuring that evidence was not only analytical but also grounded in real-world governance challenges.

Building on the territorial assessments and cross-regional analysis, the project proposes a set of policy recommendations to address gaps, strengthen resilience across all stages of the Disaster Management Cycle, and guide future planning.

- **Mitigation:** Commit to long-term risk reduction by integrating sustainable land management, infrastructure resilience, and ecosystem restoration into development planning.
- **Preparedness:** Strengthen early warning systems, community training, and emergency planning.
- **Response:** Enhance coordination, communication, and rapid mobilisation capacities.
- **Recovery:** Prioritise transformative recovery that increases resilience rather than restoring pre-crisis vulnerabilities.
- **Governance:** Promote multi-level, multi-actor governance frameworks, ensuring coherence between EU, national, regional, and local strategies.
- **Capacity building:** Support innovation, open data use, and skills development to institutionalise resilience practices.

Across the five territories, the project identified a range of best practices that demonstrate innovative, transferable approaches to strengthening resilience and recovery planning.

- Integrated water management and nature-based solutions.

- "Build Back Better" frameworks aligning recovery with mitigation.
- Dual-use infrastructure for crisis and daily needs.
- Cross-border and cross-sectoral coordination.
- Data-driven risk management tools.
- Community engagement approaches promoting equity and climate justice.

VREPO provides a comprehensive and comparative analysis of how European territories can assess and strengthen their resilience to climate, societal, and geopolitical risks. While common trends and effective practices emerge, it is important to note key differences among the case studies — including the geographical scale considered, the specific vulnerabilities addressed, the governance and multi-level coordination structures, and the varying stages of resilience strategy implementation.

The project's findings underline the urgent need for recovery-oriented policies, enhanced cross-sector coordination, and the integration of SETS perspectives into planning. The developed datasets highlight vulnerable populations, infrastructure and ecosystems, provide evidence for prioritisation and resource allocation. These datasets are easily accessible and interpretable via tailor made maps and a bespoke set of (regional applicable) indicators.

Methodology

The project adopted the **Social–Ecological–Technological Systems (SETS)** framework combined with the **Disaster Management Cycle (DMC)**. Methods included:

- **Desk research:** Establishing a data landscape for each territory, mapping available indicators, and identifying gaps in resilience-related evidence.
- **Indicator development and spatial analysis:** Creation of harmonised datasets and thematic maps showing hazards, vulnerabilities, and exposures across regions. These spatial insights supported both comparative analysis and place-specific strategy design
- **Policy documents analysis:** A systematic review of 92 strategic policy instruments at local, regional, and national levels. Using the PRISMA protocol, 329 strategies were identified, consolidated, and assessed through a Multi-Criteria Assessment (MCA). The analysis revealed strengths, overlaps, and gaps in resilience planning, particularly across the four stages of the DMC.
- **Stakeholder engagement:** A structured process including ranking exercises (prioritising hazards, exposures, and vulnerabilities) and MURAL board sessions for refining and validating strategies.

This integrated methodology ensured that the results reflected both robust analytical evidence and real-world governance needs. **VREPO equips policymakers with practical analytical, spatial, and participatory tools that transform data into actionable insights, visualise risks and vulnerabilities, assess policy gaps, and support the co-creation of evidence-based, locally tailored resilience strategies.**

Introduction

This document presents the final report of the ***Vulnerability, Resilience and Recovery Policies of the Physical Living Environment*** (VREPO) **targeted analysis**[2], conducted from September 2024 to August 2025. The study examined how five European territories – **Flanders Region (Belgium), Région SUD Provence-Alpes-Côte d'Azur (France), Lithuania, the municipality of Enschede (Netherlands), and the Southern Regional Council of Malta** – assess vulnerabilities in their living environments and design resilience and recovery strategies to respond to climate change, natural hazards, and socio-economic shocks.

The analysis was carried out within the framework of the ESPON 2030 programme, with the **Flanders Region as lead stakeholder**. Local and regional stakeholders in the five territories contributed through workshops, interviews, and validation meetings, ensuring that the **results are grounded in real policy challenges and institutional needs**. The European Council of Town Planners (ECTP-CEU) also acted as a key institutional partner throughout the project. As a pan-European professional network, ECTP provided strategic support by mobilising expertise and practice-oriented perspectives from urban and regional planners across Europe, helping to frame the methodological framework and indicators so that they are operational for spatial planning practice, and facilitating exchanges between the five case territories and the broader European planning community. ECTP also contributed to validating policy recommendations to ensure their practical implementation in urban and regional planning.

Drawing on this collaborative foundation, the project's analytical framework integrated multiple sources and perspectives to capture both the complexity and specificity of territorial challenges. Core methods included **desk research** on strategic frameworks and resilience policies, a **ranking exercise** in which each region identified and prioritised its most relevant risks, and **workshops and focus groups** in each territory enabled local and regional actors to validate findings, exchange perspectives, and co-develop insights. The ranking exercise evaluated the significance of various hazards, exposures, and vulnerabilities based on their potential impact and urgency for action, guiding the focus of the targeted analysis. The methodologies applied and the resulting rankings are presented in **Chapter 2**. This mixed approach generated both **quantitative and qualitative** insights into territorial vulnerabilities, resilience strategies, and governance practices, ensuring that the results were grounded in real-world conditions while maintaining analytical rigor.

In the ESPON VREPO project, the **scale of analysis varies by territory** to reflect differences in governance structures, data availability, and the spatial distribution of risks. **Flanders and Lithuania** are analysed at **NUTS 1** to capture broad regional patterns and align with national-level policy frameworks. **Enschede** is assessed at **the municipal level** to address local vulnerabilities and operational planning needs. **Région SUD** is examined at **NUTS 2**, reflecting the region's administrative responsibilities for resilience strategies, while **Malta** is studied

[2] A **Targeted Analysis**, according to ESPON, is a *demand-driven and tailor-made study designed to provide territorial evidence in support of policy-making at local, regional, or national level, initiated by stakeholders facing specific territorial development challenges and carried out within a broader European comparative context.*

across NUTS 1, 2, and 3 to account for its small size and the interplay between national, regional, and local dynamics. This combined bottom-up and top-down approach acknowledges interdependencies across scales: local vulnerabilities and hazards collectively shape regional and national resilience, while national policies can either mitigate or exacerbate local exposure.

Each of the five territories presents distinct vulnerabilities, reflecting diverse geographical, institutional, and socio-economic contexts:

- **Flanders Region (Belgium)** faces growing risks from flooding and heat stress, with dense urbanization and critical infrastructure exposed to cascading climate impacts.
- **Région SUD (France)** must cope with recurrent droughts, wildfires, and heat extremes, alongside flooding in coastal and riverine areas.
- **Lithuania** experiences both climate-related risks and geopolitical vulnerabilities.
- **Enschede (Netherlands)** provides insights from a local municipal perspective, with vulnerabilities linked to localized flooding, heat stress, and the integration of resilience into urban planning.
- **Malta** faces acute water scarcity, energy dependence, and exposure to coastal erosion, making it especially vulnerable as a small island state.

Despite these differences, the territories share common challenges. **Flooding, heat stress, and droughts** emerged as the most critical risks across all five cases, while **geopolitical risks** were consistently highlighted as growing threats. These shared concerns underline the importance of coordinated resilience strategies that can be adapted to local contexts.

As mentioned in the executive summary, the project responds to a central policy need: how to generate robust territorial evidence that supports more effective resilience and recovery strategies. Two core questions guided the analysis, derived directly from the Terms of Reference:

I. **PQ1:** What methodological framework and indicators can be used to build solid evidence regarding the vulnerability and degree of resilience of the living environment of a region? How should this evidence be used in practice to develop place-based resilience strategies for mitigation, preparedness, response, and recovery, to a more resilient physical environment?

II. **PQ2:** How effective are the strategies and instruments related to crises of the living environment in the stakeholder territories? What examples of good practices (embedded in the disaster management cycle) can be identified?

In addition, the analysis explored complementary issues:

- What recommendations can be made for more effective territorial resilience planning, including governance arrangements, instruments, and integration of actors (public authorities, private sector, civil society, and individuals)?
- How can the approaches to risk management integrate the perspectives and roles of the government, individuals, the private sector, and civil society institutions?

This final report summarises the project's methodology, territorial findings, and cross-regional insights. It brings together a **conceptual framework** for assessing vulnerability and resilience, evidence from the five territories, and **recommendations** for strengthening resilience and recovery planning. By doing so, it provides both a comparative perspective and territory-specific lessons that can inform future mitigation, preparedness, response, and recovery strategies.

The report is structured to provide **a logical and accessible overview** of the VREPO project and its findings. Following the **Executive Summary** and **Introduction**, the **Methodology** chapter outlines the conceptual framework used to highlights vulnerabilities as a key component of risk assessment and collect and analyse data. The core of the report lies in the **Results section**, which is organised around key policy questions (PQ1–PQ2), each addressing a specific dimension of resilience, vulnerability, and governance in the living environment. The final chapters present **targeted recommendations** and **overall conclusions**, offering practical insights for stakeholders involved in resilience planning at multiple governance levels.

In addition to this final report and its annexes, the project generated a range of **supporting outputs and intermediate deliverables**. These include **five visually engaging posters**, each highlighting the key findings of one territory, a series of **thematic maps** that reveal spatial patterns and differences across the regions, and a curated collection of **open data resources** designed to facilitate further analysis and reuse by policymakers, researchers, and other stakeholders.

1 Methodology

This chapter discusses the methodology and provides an overview of the main information needed to understand the results, conclusions, and recommendations.

The methodology is grounded in the **Social–Ecological–Technological Systems (SETS) conceptual framework**. The SETS functions as a heuristic model for positioning and connecting different understandings of complex systems. It emphasises the dynamic interactions, relationships, and interdependencies among a wide range of urban subsystems: the social, cultural, economic, and governance systems (Social); the climate, biophysical, and ecological systems (Ecological); and the technological, engineered, digital, and infrastructural systems (Technological).

A core aspect of the SETS framework is to analyse the **S–T (social–technological), S–E (social–ecological), and E–T (ecological–technological)** interactions, and understand how these interactions respond to patterns and processes emerging across system dynamics at different spatial and temporal scales (Branny, 2022; McPhearson, 2022). This leads to an understanding of resilience in spatial terms - whether urban or territorial - that extends beyond building robustness against known risks. Thus, in this project resilience is defined as **the ability of systems (social, ecological, and technological) to anticipate, absorb, recover from, and adapt to hazards while maintaining or improving their essential functions.** We defined **risks as** *The probability of a **hazard** causing harm to people, property, or the environment. It is determined by the interaction of three key components: the hazard itself (including its frequency, intensity or probability of occurring), the level of **exposure** to the hazard and the **vulnerability** of the affected system (capacity to cope vs susceptibility)*: **Risk = Hazard x Exposure x Vulnerability**

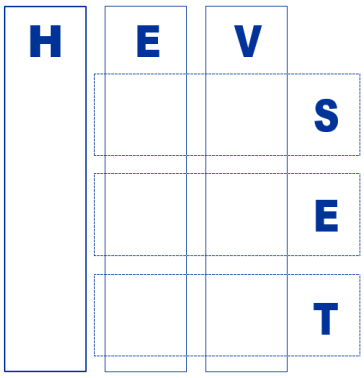


Figure 1 Overview of the Approach

This systems-based perspective provides the foundation for an **integrated methodological design**, combining both quantitative and qualitative approaches to data and information collection. Such integration ensures that the analysis captures not only measurable indicators but also contextual and experiential knowledge, thereby strengthening the robustness and applicability of the project's conclusions and recommendations.

Following the logic of the SETS framework, the process began with **desk research** to identify risks as functions of hazards, exposures and vulnerabilities, together with preliminary actions across the stages of the Disaster

Management Cycle (DMC) relevant to the five stakeholder territories. This initial step was followed by a **territory-focused risk ranking exercise**, designed to establish a concrete risk focus for each region based on hazards, exposures and vulnerabilities. To deepen this evidence base, **workshops and focus groups formed a cornerstone of the methodology**, providing essential spaces for dialogue and collective learning. They enabled stakeholders to validate findings, refine analyses, and set territorial priorities. By bringing together diverse perspectives, these participatory sessions supported the co-creation of strategies, identification of practical solutions, and exchange of good practices, while also strengthening stakeholder ownership of the project's outcomes.

1.1 Desk research

The desk research was a foundational step in the development of the methodological framework, the analysis of key strategies, and the subsequent territorial assessments. It ensured that this TA builds on existing knowledge while also addressing the specific needs of the five stakeholder territories. **The process unfolded in two phases.** The first phase, or **core desk research**, focused on identifying the base case or each region. The second phase, or **follow-up desk research**, built on these findings to provide more specific and detailed evidence, addressing gaps and overlaps identified in the first phase and directly informing the formulation of policy recommendations.

1.1.1 Data Landscape Analysis

The **core desk research on the data landscape** was designed to establish a baseline understanding of available information and to identify key sources relevant to the project's objectives. The methodology combined a review of publicly accessible datasets with the mapping of knowledge, gaps, and trends. It also accounted for the diversity of institutional frameworks across the five regions. Outputs from stakeholders' risk-ranking exercises were incorporated to support the development of meaningful and comparable metrics.

Where data gaps or inconsistencies were identified, approximations were made to maintain consistency. When approximations were not feasible, the gaps were explicitly documented in the data report[3].

The research sought to:

- **evaluate existing data sources** relevant to resilience strategies;
- **define metrics** capable of capturing the territorial dimension of risks and vulnerabilities;
- **provide a comprehensive overview of the data landscape** to support informed decision-making.

[3] **Intermediate deliverable 2 (ID2), Data report, May 2025**: A set of spatial datasets focuses on territorial resilience indicators for each region, using a common data model, format, unit of measurement, and scale where possible. Each dataset is accompanied by a brief methodological note that explains its composition. Format : one Geodatabase and one Word file.

1.1.1.1 Key Outcomes

Baseline Mapping

The research established a baseline of available data and key sources, alongside contextual insights that will guide further collection. It also mapped risks, vulnerabilities, and trends across the five territories, creating a shared foundation for comparative analysis.

Metric Development

Metrics were created through an iterative process. Stakeholders first prioritised risks by integrating hazard, exposure, and vulnerability perspectives, which shaped the initial proposal of metrics during a dedicated workshop. This collaborative process ensured that the selected metrics reflected regional realities while remaining analytically robust.

Overlay Approach

To operationalise the metrics, an overlay method was applied. Datasets on hazards, vulnerabilities, and exposures were projected onto a hexagonal grid. Polygon data (e.g., natural zones) and point data (e.g., social infrastructure) were layered with raster data (e.g., flood risk maps). Multiple sources, including regional Spatial Data Infrastructures (SDIs) and open alternatives such as OpenStreetMap, were combined to construct a harmonised grid. This database enabled complex analyses and provided a detailed understanding of regional vulnerabilities and risks.

1.1.1.2 Challenges and Limitations

The Development of a core set of territorial resilience indicators faced several challenges. Defining indicators that adequately captured the territorial dimension of resilience strategies proved complex, particularly given the diversity of institutional frameworks and the absence of standardised statistics. Other limitations included reliance on publicly accessible data, which was sometimes incomplete, outdated, or inconsistent; the inherent biases of secondary sources; and the restricted capacity of desk research to capture emerging or nuanced trends typically requiring primary data.

These limitations were addressed through the grid-based approach, continuous stakeholder consultations, and iterative refinement of metrics. As a result, the final indicators incorporated hazard perspectives, system dynamics, and vulnerabilities that extended beyond single-event risks (see chapter 2).

1.1.2 Strategic Policy Documents Analysis

The core desk research on strategic documents was undertaken first to identify relevant sources for retrieving and assessing territorial resilience strategies. The methodology combined a systematic review of existing policy instruments with active stakeholder validation. Stakeholders were invited to review the preliminary list of documents and to propose additional materials deemed regionally important. By conducting a detailed review of these strategic documents, the analysis sought to:

- **Scrutinize territorial resilience strategies** and **assess their effectiveness** across the DMC-cycle;

- **Evaluate** the overall state of play across the five regions, and;
- **Highlight potential gaps and overlaps** to support more coherent and effective resilience policies.

The review of existing documents and instruments followed the **Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) protocol** (Liberati et al., 2009), ensuring systematic treatment of available material and enabling meaningful comparison across regions. This structured approach allowed the project to assess both the content and coherence of existing strategies, while maintaining transparency and replicability in the analysis. Together, these outcomes provided a robust evidence base for the development of targeted and actionable policy recommendations. The documents analysed are listed in Policy Instrument Fact Sheets / Profiles

1.1.2.1 Key Outcomes

Scrutiny of Strategies

Territorial resilience strategies were identified from the strategic policy documents through a detailed and systematic analysis. Guided by the project's conceptual framework, each strategy was categorised and tagged according to type of crisis, hazard domain and risk, applicable region, spatial scale, primary effect, and governance level.

Assessment of Strategies

The evaluation of territorial resilience strategies was conducted through a **Multi-Criteria Assessment (MCA)** framework, combining Terms of Reference criteria, stakeholder priorities, and relevance across the DMC. This enabled systematic scoring and comparison of strategies, supported by stakeholder validation during an interactive participatory workshop (see 1.2.2 section below). The criteria applied in the MCA are summarised in Multi-Criteria Analysis.

The research reviewed the resilience strategies employed in existing documents, comparing their scope, focus, and effectiveness across the five regions. This assessment clarified which instruments had the strongest potential to enhance territorial resilience and where duplication or inefficiency occurred. The detailed analyses of the strategic documents were consolidated in an intermediate deliverable. The detailed analyses of the strategic documents and the assessment of strategies were brought together in an intermediate deliverable[4].

1.1.2.2 Challenges and Limitations

The strategic document review faced several limitations and methodological considerations that shaped the retrieval, categorization, and analysis of strategies. Variability in the scope, quality, and availability of documents across regions created challenges for comparison, while differences in institutional frameworks and reporting practices complicated alignment. Additionally, many strategic documents presented high-level objectives without detailed methodologies, limiting their usefulness for indicator development.

[4] **Intermediate deliverable 3 (ID3)**, **May 2025**: A list of operational strategies for enhancing territorial resilience across the stakeholders' regions. Format: Excel file

It is important to acknowledge several methodological choices:

- Where strategies intersected multiple dimensions—such as spatial scale, expected effects, or target groups—**only the predominant characteristic** was assigned to maintain analytical clarity.
- Although stakeholders proposed using monitoring indicators based on **Territorial Indicators**, these were ultimately excluded due to operational limitations and to avoid delays in the project timeline.
- Minor **editorial adjustments** were made to extracted strategy texts to ensure consistency and readability, especially where spatial elements were implicit.
- **Duplicate strategies** across documents were consolidated to avoid repetition.
- Not all documents in the final set of 92 yielded usable strategies, as some did not align with the refined conceptual framework, particularly the focus on hazards defined as harmful natural or human-caused events. Consequently, general policy issues such as demographic change were excluded, and **non-spatial strategies** were omitted unless highly relevant to a pressing hazard in a stakeholder region.
- While the final dataset includes a **balanced distribution** of strategies across pre- and post-crisis types, there is a noted predominance of **pre-crisis strategies**, reflecting the content of the selected policy documents.
- Although originally intended to cover 30 documents, the scope was **expanded to 92** at stakeholder request, which improved comprehensiveness but limited the feasibility of exploring strategies in policy gaps beyond the reviewed documents.

These considerations were partly mitigated by applying the **PRISMA protocol** to ensure systematic treatment of all available material and by **triangulating findings** with complementary data sources and stakeholder consultations. This ensured a transparent, replicable, and policy-relevant analysis despite the inherent challenges of cross-territory comparison..

1.1.3 Follow-up Desk Research

The follow-up desk research was conducted to complement the core desk research and to provide more detailed, targeted evidence. Its objectives were to:

- address the gaps and overlaps identified during the initial phase;
- refine the selection of indicators and instruments by testing their applicability across the five regions;
- analyse case-specific examples where resilience measures had been implemented; and
- prepare the ground for the development of targeted policy recommendations with stakeholder participation.

The methodology involved a deeper review of strategic and technical documents, further engagement with stakeholder inputs, and a more detailed comparison of regional practices. This phase also incorporated insights from complementary data sources to enhance the robustness of the findings.

1.1.3.1 Key Outcomes

Gap-Filling and Refinement

The follow-up desk research clarified uncertainties identified in the core phase, particularly where data gaps or inconsistencies had limited the scope of the initial analysis. It ensured that the proposed indicators and resilience instruments were both feasible and meaningful in practice.

Integration with Policy Objectives

Findings from this phase were directly aligned with the policy dimension of the project. By linking technical evidence to regional priorities, the research strengthened the connection between resilience assessment and actionable decision-making.

Support for Territorial Assessments

The refined evidence base provided clear inputs for the territorial assessments conducted in subsequent phases of the project. This ensured continuity between the desk research and the applied analysis across the five regions.

1.1.3.2 Challenges and Limitations

The follow-up research was limited by the availability of sufficiently detailed and comparable evidence across regions. In some cases, documentation remained too general or lacked the granularity required for operationalisation. Despite these limitations, triangulation with stakeholder knowledge and complementary datasets enabled the project to develop a coherent and balanced evidence base.

1.2 Stakeholder engagement

The stakeholder engagement plan was structured to ensure both input and validation from a range of stakeholders throughout the project. Stakeholders were categorized into two groups. **Collaborative stakeholders**, such as Steering Committee members and ECTP-CEU representatives, actively shaped the project by contributing ideas, sharing expertise, and informing recommendations. **Consultative stakeholders**, including policymakers, planners, and regional or national authorities, provided feedback on outputs, contributed practical knowledge, and validated the feasibility of proposed recommendations.

Engagement occurred through a variety of activities, including **ranking exercises** (further elaborated in the following section 1.2.1)**, in-person workshops, regional focus groups, a cross-regional online workshop, and online participatory exercises using MURAL Boards** (further elaborated in the following section 1.2.2)**.**

1.2.1 Ranking exercise

To prioritise the key risks most relevant to each region, stakeholder regions conducted a ranking exercise of hazards, exposures, and vulnerabilities. The aim was to capture regional perspectives on the significance of risks in terms of potential impact and urgency for action. This process supports a comprehensive understanding of stakeholder priorities and provides a robust evidence base to inform policy recommendations.

The exercise was based on a carefully curated list of risks, drawing on insights from the Vilnius workshop (first workshop), stakeholder consultations, and academic analysis. Each region was asked to review this list and assign rankings, using a standardised approach to ensure comparability.

The steps followed by stakeholder regions were as follows:

I. **Review of risks** – Regions examined the provided list of hazards, exposures, and vulnerabilities to assess their potential contribution to regional risk profiles.

II. **Assignment of rankings** – Each risk was ranked according to importance:

   a. **1** = most critical, requiring immediate attention.

   b. **2–5** = progressively lower priority, with **5** being the lowest.

   c. Blank spaces = risk not considered relevant for that specific region.

   d. In some cases, regions differentiated not only entire risk rows (hazards with associated exposures/vulnerabilities) but also individual vulnerabilities (e.g., infrastructure).

III. **Calculation of averages** – An "Average" column was generated from the submitted rankings, excluding blank spaces.

During the ranking, regions considered the following **key factors**:

- **Relevance to planning frameworks** (spatial, climate adaptation, environmental policies).
- **Policy gaps** (weaknesses or omissions in existing frameworks).
- **Likelihood of occurrence** (past frequency or expected future probability).
- **Severity of impact** (potential harm to people, infrastructure, the economy, or environment).
- **Regional context** (specific local characteristics increasing the relevance or urgency of a risk).

Where possible, regions were encouraged to provide **justifications** for their rankings, such as:

- unique regional challenges or vulnerabilities;
- identified gaps in policies or resources;
- potential for significant social, economic, or environmental impacts.

1.2.1.1 Key Outcomes

The results of the ranking exercise are presented in the following chapter. Each region assigned a ranking based on its assessment of the severity and relevance of risks, combining hazard and vulnerability considerations.

- The **"Count" column** shows the number of regions (out of five) that provided a ranking for each risk.
- The **"Weighted average"** column presents the mean ranking (excluding missing values).
- The table is ordered first by **Count** (risks considered by all five regions are listed first). Within each count group, risks are sorted by the **Weighted average**, with the lowest average (i.e. highest priority, rank 1) at the top.

This approach highlights both **shared priorities across all regions** and **region-specific concerns**. It also provides a transparent basis for identifying risks most urgently requiring coordinated action and for distinguishing where resilience strategies need to be tailored to local contexts.

1.2.1.2 Challenges and Limitations

The ranking exercise, while systematic, faced several limitations, primarily related to the **capacity and resources available in each region**. Conducting such a ranking is a complex task that would normally require months of deliberation within a government, and not all regions had the same level of expertise or time to dedicate. For example, the Flemish exercise benefited from an existing risk assessment by the Belgian National Crisis Centre, which provided a solid starting point, whereas other regions lacked comparable baseline data. Additional challenges included **variability in regional contexts**, which made some risks relevant only in certain areas**, subjectivity** in how impact, urgency, and policy relevance were weighed, **differences in data availability** and comparability, and **limited depth of justifications** that reduced interpretability.

These limitations were mitigated through **clear instructions, a standardised risk list, and the use of averages** to balance individual differences. Nevertheless, the results should be interpreted as reflecting regional priorities and perspectives rather than an absolute or definitive hierarchy of risks.[5].

1.2.2 Mural board exercise

The participatory Mural board exercise marked the concluding stage of validation and collective discussion on the identification and assessment of territorial resilience strategies among the regions. The aim was to examine the preliminary outcomes of both the MCA-assessment performed by the consortium as well as the stakeholder pre-assessment of the extracted strategies.

The workshop was designed as an interactive forum, employing Mural as a digital engagement tool to structure dialogue and gather stakeholder input. Each region worked with a dedicated Mural template tailored to a specific hazard theme (Figure 2). In the upper section of the template, the strategies were displayed along a dual-axis framework representing relevant–irrelevant and applied–not applied, showcasing the majority of the answers of responses from the earlier ranking exercise (1.2.1). The colour coding indicated the corresponding MCA scores. The Mural template enabled stakeholders to drag and drop strategies in order to:

- **Clarify** regional specificities;
- **Identify** promising strategies;
- **Highlight** missing elements or gaps; and
- **Refine** existing strategies by suggesting improvements.

The approach strengthened the prioritisation process of the territorial resilience strategies and enabled regions to draw on the input of hazard-specific external experts, as well as to engage in cross-regional discussions. This integration ensured that the final selected strategies were not only conceptually sound but also practically relevant, as they are validated by representatives from each region. By conducting the exercise, the process facilitated tailored and region-specific feedback, which was subsequently used to draft region-specific policy recommendations.

[5] The detailed methodology of the ranking exercise is explained in the intermediate deliverable, which is broken down into six separate reports: one for each region and one on commonalities. **Intermediate deliverables, March 2025**

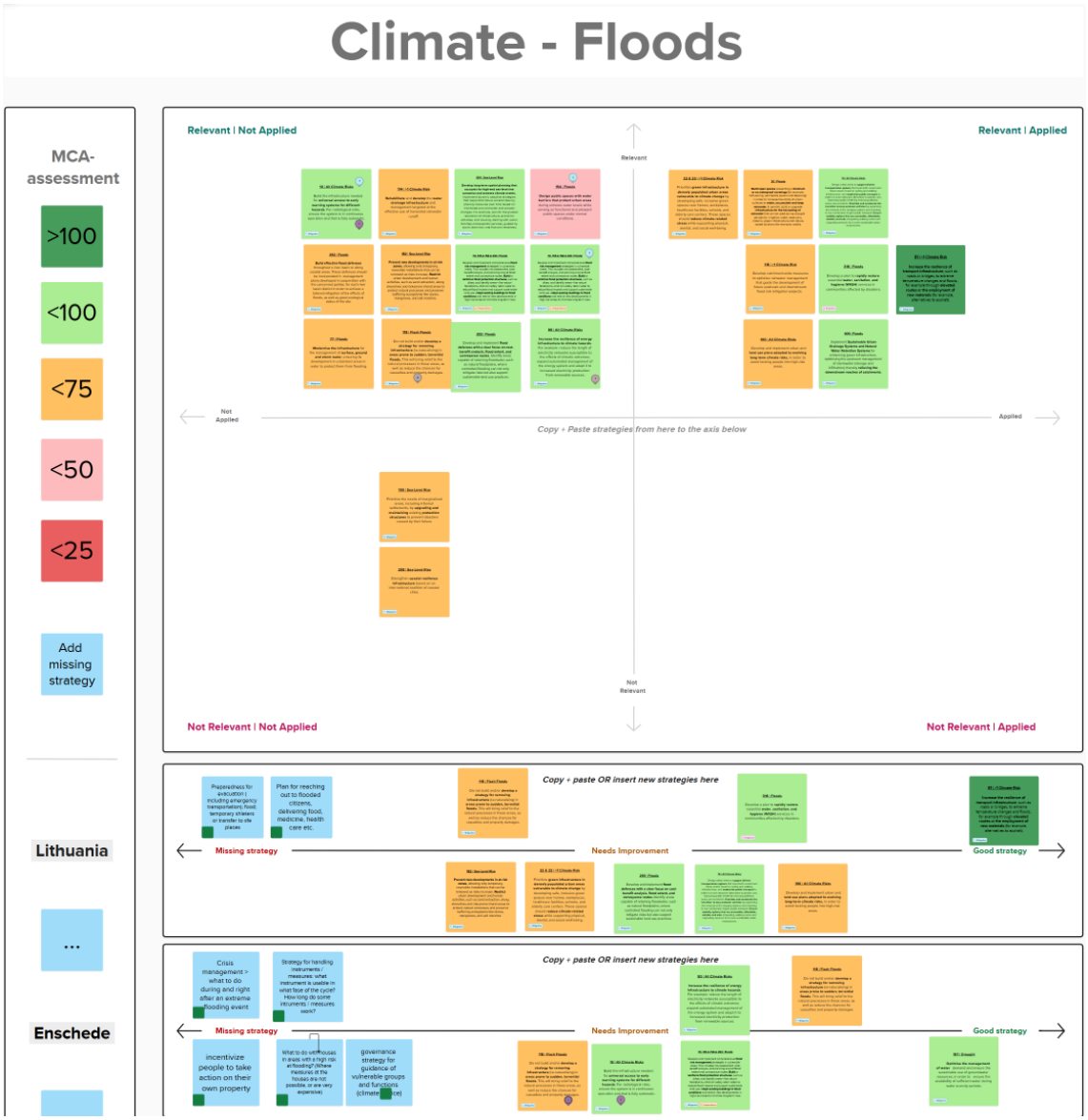


Figure 2: Example Mural Board template for Climate–Floods strategies, showing how regions identified and refined resilience measures

1.2.2.1 Key Outcomes

The results of the Mural Board exercise provided the final input for defining the set of region-specific territorial resilience strategies. These strategies will serve as the basis for drafting policy recommendations and for generating further insights. The exercise contributed to three main outcomes:

- **Validation of MCA findings –** confirming the robustness of the multi-criteria analysis results.
- **Refinement of strategy descriptions –** including the consolidation of overlapping measures, clarification of additional needs, and identification of missing elements.
- **Confirmation of strategies for Task 4** – identifying which strategies should move forward as inputs for policy recommendations.

By integrating MCA assessments with stakeholder perspectives, the exercise ensured that the research outputs are not only evidence-based but also regionally grounded and comprehensive.

1.2.2.2 Challenges and Limitations

While the Mural Board exercise provided valuable input, some limitations should be acknowledged:

- **Dependence on regional capacity and expertise** – Conducting this exercise is highly complex and would normally require months of deliberation within a government. The depth and completeness of inputs were influenced by the **time and expertise each region could dedicate**, which varied significantly.
- **Dependence on stakeholder involvement** – The quality of contributions was closely tied to the engagement of regional stakeholders and their ability to involve hazard-specific experts to populate the templates. This approach was necessary to capture **local knowledge and context-specific priorities**, complementing the broader expertise of the consortium.
- **Time constraints during the workshop** – The live session allowed only limited discussion, potentially restricting the depth of feedback. Additional time was granted afterward for regions to refine and complement their contributions.
- **Subjectivity across regions** – Differences in interpretation and prioritisation among regions introduced a degree of subjectivity into the exercise, reflecting diverse local contexts and perspectives.

Recognising these limitations frames the results with appropriate caution, while also highlighting the value of complementary methods and iterative validation. Importantly, the approach balances **regional insights with consortium expertise**, ensuring that the findings remain robust, contextually grounded, and actionable.

2 Results

This chapter presents the main results of the **VREPO project**, structured around the two core policy questions (PQ1 & PQ2) and related insights.

The first two section addresses **PQ1** by summarising the **conceptual framework, data sources, and key indicators** applied across the five territories. Findings highlight how hazards, exposures, vulnerabilities, and resilience capacities can be measured and compared, providing a robust evidence base for territorial planning.

The second section focuses on **PQ2** by presenting the **policy assessment** across the five territories. The findings address the **effectiveness of strategies and instruments** used in crisis management across the five territories This analysis supports the **practical applications of the collected evidence** in mitigation, preparedness, response, and recovery planning, providing **a basis for policy recommendations**. The results demonstrate how local, regional, and national actors can integrate these insights into policy design, governance arrangements, and strategic interventions to strengthen resilience.

Complementary results include the identification of **best practices** and their integration within the **DMC** along with the recommendations for more **coordinated and multi-actor resilience planning**, that encompasses governance, instruments, and stakeholder integration.

2.1 Conceptual Framework for Evaluating Regional Vulnerability and Resilience

This subchapter addresses **Policy Question 1** – ***What methodological framework and indicators can be used to build solid evidence regarding the vulnerability and degree of resilience of the living environment of a region?***

The project has developed a **comprehensive, integrated framework** to evaluate the vulnerability and resilience of a region's living environment. Building on **Disaster Risk Management principles**, the **Disaster Management Cycle (DMC)**, and the **Social-Ecological-Technological-System (SETS) perspective**, the framework shifts from reactive disaster management to **proactive strategies** that reduce disaster impacts by addressing the interactions between hazards, vulnerability, and exposure through the lens of capacities across SETS (Figure 3).

The framework follows a **dual approach**, reflecting the **double aim of the Targeted Analysis**:

I. **Evidence-based assessment of regional vulnerabilities** – The framework enables policymakers to understand the specific degree of resilience of their region in comparison with other (similar or dissimilar) regions. Analyses and indicators provide essential tools to identify the weakest characteristics of a territory and determine which **place-based approaches** are most suitable. This evidence focuses on a defined set of vulnerabilities linked to hazards affecting the physical living environment.

II. **Development of practical, context-specific resilience strategies** – Beyond assessment, the framework supports the design of strategies for mitigation, preparedness, response, and particularly

recovery, targeting a more resilient physical living environment both **post- and pre-calamity**. These strategies integrate territorial content, governance structures, and instruments, drawing on scientific evidence, peer learning, academic insights, and international frameworks. They are embedded across all stages of the DMC to ensure a **holistic, systems-based, and iterative approach** to both acute and chronic risks.

Through this dual approach, resilience planning explicitly addresses **social cohesion, equitable access to resources, technological monitoring, and ecological buffers**, enabling systems to withstand, adapt, and recover from hazards. By linking evidence generation with strategy development, the framework provides policymakers with a **comprehensive tool to set priorities, guide interventions, and strengthen the adaptive capacity of regional living environments**.

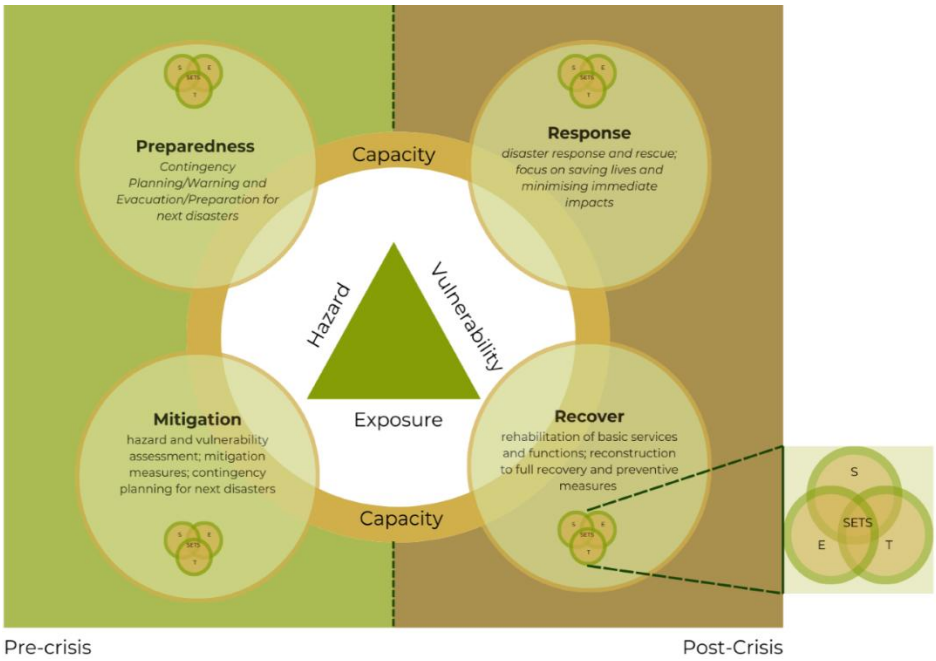


Figure 3 Conceptual framework for territorial resilience, showing how hazards, vulnerability, exposure, and SETS capacities interact across the Disaster Management Cycle to support resilience assessment and regional planning.

Following the development of the conceptual framework, each stakeholder region was asked to complete a ranking exercise to assess risks specific to their region. The objective was to identify and prioritize key risks, thereby helping to focus the Target Analysis. This process evaluated the significance of various hazards, exposures, and vulnerabilities based on their potential impact and urgency for action. The methodology applied by each region, along with the corresponding rankings, is described in **Ranking exercise**. Below, we present a summary of the results from this ranking exercise for each region. Detailed results are available in the intermediate deliverable[6].

[6] The results of the ranking exercise is explained in the intermediate deliverable, which is broken down into six separate reports: one for each region and one on commonalities. **Intermediate deliverables, March 2025**

2.1.1.1 Flanders

The risk assessment ranking exercise for Flanders highlights that flooding threatens communities near rivers and valleys, including the Scheldt estuary, as well as older populations, critical infrastructure, and agricultural land. Heat stress primarily affects older people and urban residents. Additional hazards, such as storms, nature fires, droughts, armed conflict, and CBRNe events, further impact infrastructure, social systems, the economy, and ecosystems.

Table 1 The priority areas of Flanders, including the main risk categories, alongside their hazards, exposures, and associated vulnerabilities.

Risks	Hazards	Exposure	Vulnerabilities
Climate risks	Floods	Communities living near rivers and valleys Agriculture zones Forests Critical infrastructure Populations in urban areas Strategic targets	Infrastructure Social Economy Land & ecosystems
	Heat stress		
	Storms		
	Nature fires		
	Droughts		
Geopolitical risks	Armed conflict		
Public health risks	CBRNe		

2.1.1.2 Region SUD

The risk assessment ranking exercise for the Sud de France region highlights increasing environmental and societal risks. Flooding is becoming more frequent, despite existing mitigation strategies. Coastal retreat threatens both natural and built environments, requiring strengthened measures. Aquatic ecosystems, such as "Etang de Berre", are under pressure from invasive alien species—blue crab, ragweed, and Opuntia—with blue crab now nearly impossible to control. Additional risks include heat stress, storms, nature fires, and geopolitical or public health threats, all of which impact infrastructure, communities, ecosystems, and the economy.

Table 2 The priority areas of Région SUD, including the main risk categories, alongside their hazards, exposures, and associated vulnerabilities.

Risks	Hazards	Exposure	Vulnerabilities
Climate risks	Floods	Communities living in basins or valleys Native flora and fauna Aquatic ecosystems Overdeveloped urban areas Critical infrastructure Coastal dunes Strategic targets	Infrastructure Social Land & ecosystems Economy
	Heat stress		
	Coastline erosion		
	Storms		
	Invasive alien species		
	Nature fires		
Geopolitical risks	Terrorism & cyberattacks		
Public health risks	CBRNe		

2.1.1.3 Lithuania

The risk assessment ranking exercise for Lithuania identifies key environmental, social, and geopolitical threats. Flooding and nature fires threaten individuals, infrastructure, and ecosystems. Terrorism and armed conflict ranked high due to propaganda and misinformation, putting entire societies and communities in conflict zones at risk. Public health risks, such as pandemics, further affect infrastructure, social systems, and economic stability.

Table 3 The priority areas of Lithuania, including the main risk categories, alongside their hazards, exposures, and associated vulnerabilities.

Risks	Hazards	Exposure	Vulnerabilities
Climate risks	Floods	Individuals living in flood prone areas Critical infrastructure Border regions Areas near CBRNe installations Strategic targets	Infrastructure Social Technological Land & ecosystems
	Nature fires		
Geopolitical risks	Terrorism & cyberattacks		
	Armed conflict		
Public health risks	Pandemics		
	CBRNe		

2.1.1.4 Enschede

The risk assessment ranking exercise for Enschede highlights that floods pose the greatest threat to residents' livelihoods and homes. Key vulnerabilities include sewer overflows and limited access to critical infrastructure during flood events, which can disrupt essential services and daily life. While heat stress has not been a primary concern for the municipality, there are measures and strategies that could be implemented to address potential heat-related risks in the future.

Table 4 The priority areas of Enschede, including the main risk categories, alongside their hazards, exposures, and associated vulnerabilities.

Risks	Hazards	Exposure	Vulnerabilities
Climate risks	Floods	Communities living in flood-prone areas Densely built urban areas Farms and agricultural hubs Critical infrastructure Strategic targets	Social Infrastructure Public health
	Heat stress		
	Droughts		
	Storms		
Geopolitical risks	Terrorism & cyberattacks		
	Armed conflict		
Public health risks	CBRNe		
	Pandemics		

2.1.1.5 Malta

The risk assessment ranking exercise for Malta highlights key climate, social, and geopolitical risks. Flooding, storms, heat stress, droughts, and submarine landslides affect coastal communities, urban areas, agriculture zones, and marine ecosystems. Vulnerable beaches and bays, such as Ghadira, Marsaxlokk Bay, and Il-Hofra il-Kbira, are particularly prone to coastline erosion. Pandemics pose significant risks to older adults, children, caregivers, and other vulnerable populations, while terrorism, cyberattacks, and armed conflict further threaten social, infrastructure, economic, and governance systems.

Table 5 The priority areas of Malta, including the main risk categories, alongside their hazards, exposures, and associated vulnerabilities.

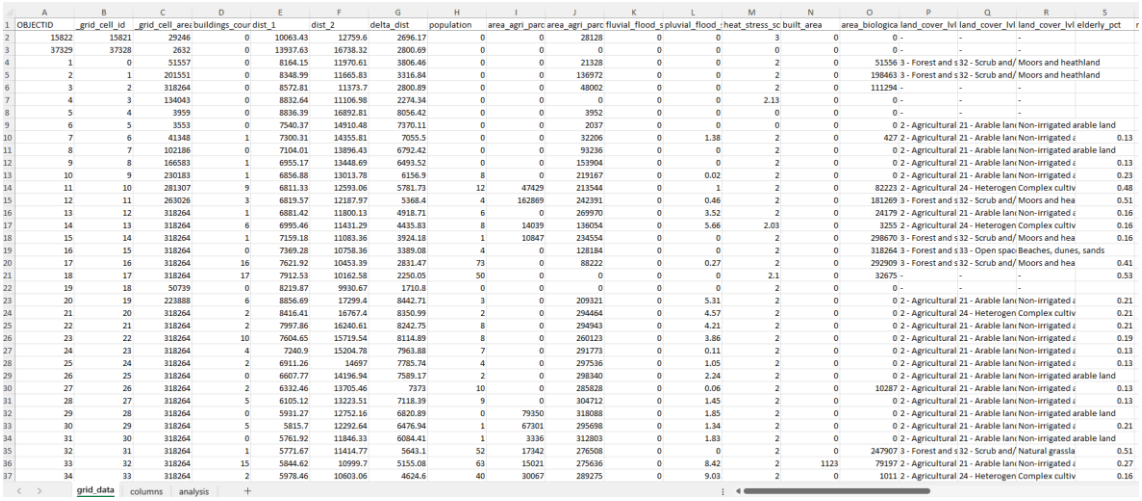
Risks	Hazards	Exposure	Vulnerabilities
Climate risks	Floods	Communities living in coastal areas Agriculture zones Critical infrastructure Populations in urban areas Marine ecosystems and seabeds Bank clients Strategic targets	Social Infrastructure Land & ecosystems Economy Policy & governance
	Heat stress		
	Storms		
	Droughts		
	Submarine landslides		
Geopolitical risks	Terrorism & cyberattacks		
	Armed conflict		
Public health risks	Pandemics		

2.2 Indicators and Spatial Analysis for Evaluating Regional Vulnerability and Resilience

This subchapter addresses **Policy Question 1** – ***What methodological framework and indicators can be used to build solid evidence regarding the vulnerability and degree of resilience of the living environment of a region?***

Building on the conceptual framework and the ranking exercise, the **selection of resilience indicators** was undertaken. These indicators were organized according to the **SETS dimensions** and the risk definitions presented in Figure 4. This approach ensures that the measurement of resilience is directly linked to the framework's structure and to the specific hazards, exposures and vulnerabilities, identified for each region. For the five territories, all data have been compiled into an **Tabular data set** included in ID2[7].

The tabular data set is an Excel table, identical to the geospatial data set but without the coordinate information. This data set offers more flexibility to add columns, create graphs and calculate KPIs.



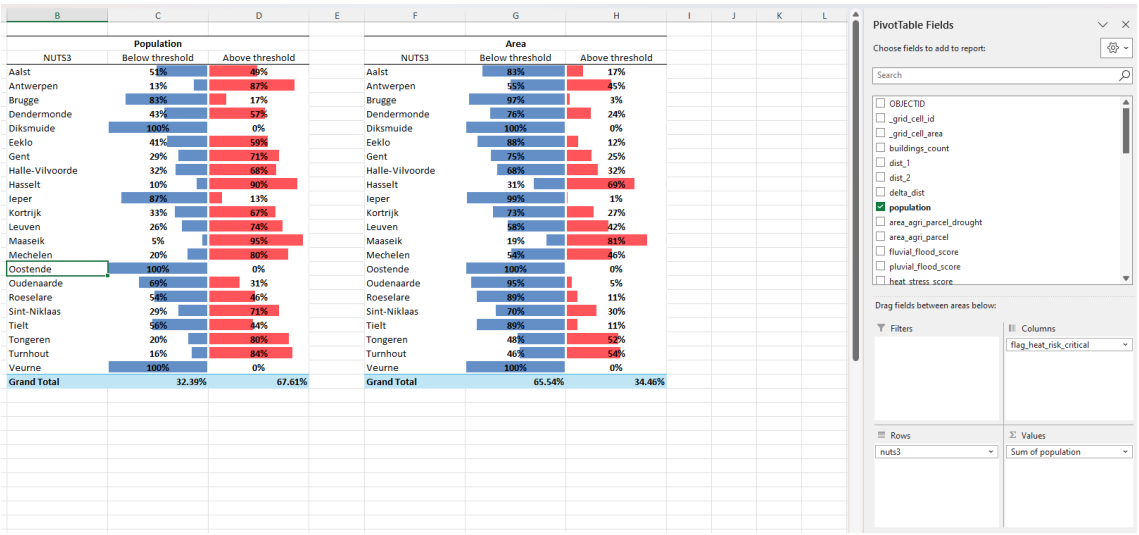
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	OBJECTID	grid_cell_id	grid_cell_area	buildings_cour	dist_1	dist_2	delta_dist	population	area_agri_parc	area_agri_parc	fluvial_flood_s	pluvial_flood_	heat_stress_sc	built_area	area_biologica	land_cover_lvl	land_cover_lvl	land_cover_lvl	elderly_pct
2	15822	15821	29246	0	10063.43	12759.6	2696.17	0	0	28128	0	0	3	0	0	-	-	-	
3	37329	37328	2632	0	13937.63	16738.32	2800.69	0	0	0	0	0	0	0	0	-	-	-	
4	1	0	51557	0	8164.15	11970.61	3806.46	0	0	21328	0	0	2	0	51556	3 - Forest and s	32 - Scrub and/	Moors and heathland	
5	2	1	201551	0	8348.99	11665.83	3316.84	0	0	136972	0	0	2	0	198463	3 - Forest and s	32 - Scrub and/	Moors and heathland	
6	3	2	318264	0	8572.81	11373.7	2800.89	0	0	48002	0	0	2	0	111294	-	-	-	
7	4	3	134043	0	8832.64	11106.98	2274.34	0	0	0	0	0	2.13	0	0	-	-	-	
8	5	4	3959	0	8836.39	16892.81	8056.42	0	0	3952	0	0	0	0	0	-	-	-	
9	6	5	3553	0	7540.37	14910.48	7370.11	0	0	2037	0	0	0	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated arable land	
10	7	6	41348	1	7300.31	14355.81	7055.5	0	0	32206	0	1.38	2	0	427	2 - Agricultural	21 - Arable lan	Non-irrigated	0.13
11	8	7	102186	0	7104.01	13896.43	6792.42	0	0	93236	0	0	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated arable land	
12	9	8	166583	1	6955.17	13448.69	6493.52	0	0	153904	0	0	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.13
13	10	9	230183	1	6856.88	13013.78	6156.9	8	0	219167	0	0.02	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.23
14	11	10	281307	9	6811.33	12593.06	5781.73	12	47429	213544	0	1	2	0	82223	2 - Agricultural	24 - Heterogen	Complex cultiv	0.48
15	12	11	263026	3	6819.57	12187.97	5368.4	4	162869	242391	0	0.46	2	0	181269	3 - Forest and s	32 - Scrub and/	Moors and hea	0.51
16	13	12	318264	1	6881.42	11800.13	4918.71	6	0	269970	0	3.52	2	0	24179	2 - Agricultural	21 - Arable lan	Non-irrigated	0.16
17	14	13	318264	6	6995.46	11431.29	4435.83	8	14039	136054	0	5.66	2.03	0	3255	2 - Agricultural	24 - Heterogen	Complex cultiv	0.16
18	15	14	318264	1	7159.18	11083.36	3924.18	1	10847	234554	0	0	2	0	298670	3 - Forest and s	32 - Scrub and/	Moors and hea	0.16
19	16	15	318264	0	7369.28	10758.36	3389.08	4	0	128184	0	0	2	0	318264	3 - Forest and s	33 - Open spac	Beaches, dunes, sands	
20	17	16	318264	16	7621.92	10453.39	2831.47	73	0	88222	0	0.27	2	0	292909	3 - Forest and s	32 - Scrub and/	Moors and hea	0.41
21	18	17	318264	17	7912.53	10162.58	2250.05	50	0	0	0	0	2.1	0	32675	-	-	-	0.53
22	19	18	50739	0	8219.87	9930.67	1710.8	0	0	0	0	0	2	0	0	-	-	-	
23	20	19	223888	6	8856.69	17299.4	8442.71	3	0	209321	0	5.31	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.21
24	21	20	318264	2	8416.41	16767.4	8350.99	2	0	294464	0	4.57	2	0	0	2 - Agricultural	24 - Heterogen	Complex cultiv	0.21
25	22	21	318264	2	7997.86	16240.61	8242.75	8	0	294943	0	4.21	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.21
26	23	22	318264	10	7604.65	15719.54	8114.89	8	0	260123	0	3.86	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.19
27	24	23	318264	4	7240.9	15204.78	7963.88	7	0	291773	0	0.11	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.13
28	25	24	318264	2	6911.26	14697	7785.74	4	0	297536	0	1.05	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.13
29	26	25	318264	0	6607.77	14196.94	7589.17	2	0	298340	0	2.24	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated arable land	
30	27	26	318264	2	6332.46	13705.46	7373	10	0	285828	0	0.06	2	0	10287	2 - Agricultural	21 - Arable lan	Non-irrigated	0.13
31	28	27	318264	5	6105.12	13223.51	7118.39	9	0	304712	0	1.45	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.13
32	29	28	318264	0	5931.27	12752.16	6820.89	0	79350	318088	0	1.85	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated arable land	
33	30	29	318264	5	5815.7	12292.64	6476.94	1	67301	295698	0	1.34	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated	0.21
34	31	30	318264	0	5761.92	11846.33	6084.41	1	3336	312803	0	1.83	2	0	0	2 - Agricultural	21 - Arable lan	Non-irrigated arable land	
35	32	31	318264	1	5771.67	11414.77	5643.1	52	17342	276508	0	0	2	0	247907	3 - Forest and s	32 - Scrub and/	Natural grassla	0.51
36	33	32	318264	15	5844.62	10999.7	5155.08	63	15021	275636	0	8.42	2	1123	79197	2 - Agricultural	21 - Arable lan	Non-irrigated	0.27
37	34	33	318264	2	5978.46	10603.06	4624.6	40	30067	289275	0	9.03	2	0	1011	2 - Agricultural	24 - Heterogen	Complex cultiv	0.16

grid_data | columns | analysis

Using this table, it is possible for e.g. to filter the population exposed to heat stress above a critical average value of 4, by nuts 3 region. To achieve this, it is most convenient to first create a column that flags if the heat stress metric exceeds 4. Then, simple pivot table can display the criticality of heat stress in each nuts3 region. Note the usage of metrics in the screenshot below.

For e.g. mostly areas situated in the east of Flanders are at risk (provinces Antwerp and Limburg). Another observation is that the exposure of area is lower than the exposure of population. This indicates that heat stress is mainly an issue in densely populated areas (which is a known finding).

[7] The tabular data sets can be downloaded on the following link: https://filetransfer.swecogroup.com/link/hV4GhrFJKRf09r2GbHkNjK



	Population	
NUTS3	Below threshold	Above threshold
Aalst	51%	49%
Antwerpen	13%	87%
Brugge	83%	17%
Dendermonde	43%	57%
Diksmuide	100%	0%
Eeklo	41%	59%
Gent	29%	71%
Halle-Vilvoorde	32%	68%
Hasselt	10%	90%
Ieper	87%	13%
Kortrijk	33%	67%
Leuven	26%	74%
Maaseik	5%	95%
Mechelen	20%	80%
Oostende	100%	0%
Oudenaarde	69%	31%
Roeselare	54%	46%
Sint-Niklaas	29%	71%
Tielt	56%	44%
Tongeren	20%	80%
Turnhout	16%	84%
Veurne	100%	0%
Grand Total	32.39%	67.61%

	Area	
NUTS3	Below threshold	Above threshold
Aalst	83%	17%
Antwerpen	55%	45%
Brugge	97%	3%
Dendermonde	76%	24%
Diksmuide	100%	0%
Eeklo	88%	12%
Gent	75%	25%
Halle-Vilvoorde	68%	32%
Hasselt	31%	69%
Ieper	99%	1%
Kortrijk	73%	27%
Leuven	58%	42%
Maaseik	19%	81%
Mechelen	54%	46%
Oostende	100%	0%
Oudenaarde	95%	5%
Roeselare	89%	11%
Sint-Niklaas	70%	30%
Tielt	89%	11%
Tongeren	48%	52%
Turnhout	46%	54%
Veurne	100%	0%
Grand Total	65.54%	34.46%

From these data sets, indicators can be constructed in line with the policy analysis and recommendations.

Figure 4 Data structure and key indicators

Using the data structure illustrated in Figure 4, relevant data for each territory were collected to create corresponding maps. Figure 4 outlines how the data are organized according to the definition of risk (Hazard × Exposure × Vulnerability), while also incorporating impact factors and key metrics to identify the resilience stage in which each indicator is most developed.

These indicators are organised around three key concepts that guide risk assessment and policy action: **Hazard-Prone Areas**, **Exposure**, and **Vulnerability**.

- **Hazard-Prone Areas** identify locations most likely to experience specific hazards, such as flood zones or wildfire-prone regions. This helps policymakers understand *where* risks originate.
- **Exposure** combines hazard data with territorial characteristics—such as land use, population, and infrastructure—to show which assets or communities lie within risk zones. This supports targeted urban planning and resource allocation.
- **Vulnerability** integrates exposure data with social and economic indicators—such as income distribution, building quality, or access to services—to highlight which groups are *most at risk* and where resilience measures should be prioritised.

The risks are categorized following the SET framework (Social, Environmental, and Technological). This data organization enables not only the analysis of risks but also the assessment of resilience indicators, their impacts, and related policy measures.

These **maps provide a spatial representation of key risks and related factors**, supporting a clearer understanding of regional vulnerabilities. These maps should be regarded **not as an individual indicator**, but as a **composite analytical product** derived from multiple spatial indicators. The full set of maps is compiled in the regional reports and the Maps Atlas. The maps provide policymakers with a clear spatial overview of hazards, exposures, and vulnerabilities, enabling them to identify priority areas, allocate resources more effectively, and design targeted strategies across all fours DMC stages. In addition, the raw data collected during the study are available for each region, allowing policymakers to develop additional maps of interest to further explore specific issues or emerging priorities.

2.2.1.1 Flanders

The Flanders dataset integrates spatial indicators grouped into three dimensions:

- **Hazards** – natural events affecting the region:
  - **Fluvial Flood Risk** – areas exposed to river flooding
  - **Heat Risk** – areas experiencing extreme heat
  - **Wildfire Risk** – areas at risk of wildfires
  - **Agricultural Drought Exposure** – farmland sensitive to drought
- **Critical Infrastructures** – essential facilities and networks:
  - **Wastewater Treatment Plants**
  - **Industrial Risk Sites**
  - **Military Areas**
  - **Road Network Classes**

- **Social and Ecological Vulnerabilities** – people, assets, and ecosystems at risk:
    - **Population Density**
    - **Buildings Count and Type**
    - **Agricultural Land Area**

Table 6 Flanders Spatial Indicators

Category	Indicator	Expanded Description
Hazards	fluvial_flood_cat	Identifies areas at risk of flooding from rivers or streams during heavy or prolonged rainfall; essential for flood protection and spatial planning.
	flag_heat_risk_critical	Highlights areas with high heat exposure, often linked to urban heat islands; supports adaptation measures such as greening and cooling strategies.
	wildfire_risk	Indicates zones susceptible to wildfire outbreaks, particularly in forested or agricultural regions; informs emergency preparedness and land management.
	area_agri_parcel_drought	Measures agricultural areas exposed to drought conditions; helps assess impacts on food security and water resource planning.
Critical Infrastructures	wastewater_treatment_plant	Locations of facilities essential for water sanitation; flooding of these sites can cause secondary contamination risks.
	industrial_risk_site	Identifies facilities handling hazardous materials; crucial for assessing technological risk and emergency response capacity.
	military_area	Indicates zones with restricted access or strategic functions; relevant for crisis planning and coordination.
	road_class	Maps major road networks, showing critical transport links that may be disrupted by floods or other hazards.
Social & Ecological Vulnerabilities	population	Population density data identifying concentrations of people exposed to hazards.
	buildings_count	Number of buildings, used to assess asset exposure in hazard-prone areas.
	buildings_cat	Classification of buildings (residential, industrial, commercial); supports damage assessment and recovery planning.
	area_agri_parcel	Extent of agricultural land, showing potential economic vulnerability to climate hazards.

With these indicators, the following map and graph can be created. Other combinations between the indicators are possible after further data analysis.

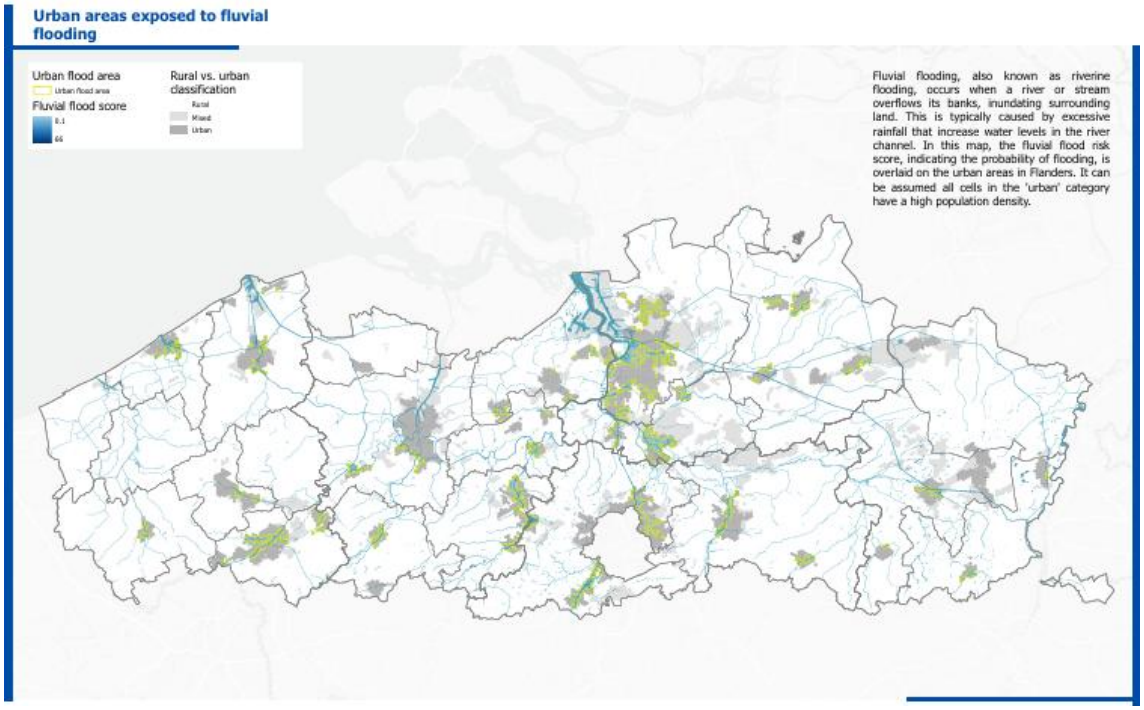


Figure 5 Urban areas exposed to fluvial Flooding
Indicators: fluvial flood risk; urban land-use classification

The urban flood exposure map of Flanders illustrates areas where riverine flooding poses a risk to densely populated built-up zones, integrating fluvial flood probability with urban land-use data. By highlighting where populations and infrastructure are most vulnerable, this composite layer supports targeted risk management, spatial planning, and flood mitigation strategies. Policymakers can use these insights to prioritize flood-resilient urban development, strengthen drainage and protective infrastructure, and incorporate flood-risk considerations into city planning.

2.2.1.2 Region SUD

The Region Sud dataset includes indicators grouped into four dimensions:

- **Hazard & Risk**: Fluvial Flooding, Heatwaves, Wildfire Risk, Proximity to Nuclear Plants
- **Population & Demographics**: Population Size, Age Structure, Foreign-born Population, Median Income
- **Built Environment & Urbanization**: Number of Buildings, Built-up Area, Urban Green Spaces, Urbanization Level/Class
- **Social, Technological, and Ecological Vulnerabilities**: Access to Hospitals/Schools, Energy and Industrial Facilities, Military Zones, Biodiversity Intactness Index

Table 7 Region Sud Spatial Indicators

Category	Indicator	Expanded Description
Hazard & Risk	fluvial_flood_score	Areas exposed to river flooding, affecting urban and rural settlements.
	heat_waves_4_5	Frequency and intensity of heatwaves; critical for public health and energy demand management.
	wildfire_risk	Probability of wildfire occurrence based on vegetation, topography, and climate; supports prevention strategies.
	dist_nuclear_pp	Proximity to nuclear power plants; indicates potential exposure to technological or cascading risks.
Population & Demographics	population	Distribution and density of inhabitants; fundamental for impact modelling.
	elderly_pct	Share of elderly residents; indicates potential vulnerability to health and evacuation risks.
	young_pct	Proportion of children and youth; informs risk education and protection priorities.
	foreigners_pct	Share of foreign population; supports social inclusion in preparedness measures.
	median_income	Median income per area; economic capacity influences recovery and adaptation potential.
Built Environment & Urbanization	buildings_count	Total number of buildings; measures physical exposure.
	built_area	Surface of built-up zones; useful for evaluating imperviousness and flood runoff potential.
	urban_green_area	Amount of urban vegetation; contributes to cooling and flood mitigation.
	rural_urban_class	Degree of urbanization; classifies settlement types for targeted resilience actions.
Social, Technological, Ecological Vulnerabilities	social_infra_hospital	Location of hospitals and healthcare facilities; essential for emergency accessibility.
	social_infra_education	Educational facilities; key for community preparedness and safe sheltering.
	critical_energy_infra	Power plants, substations, and energy supply networks; critical for continuity of essential services.
	industrial_risk_site	Sites handling hazardous materials; potential sources of secondary risk in disasters.

Category	Indicator	Expanded Description
	military_area	Areas reserved for defense; may restrict access during crisis operations.
	biodiversity_intact_index	Degree of ecosystem integrity; indicates environmental resilience and natural buffers.

With these indicators, the following map and graph can be created. Other combinations between the indicators are possible after further data analysis.

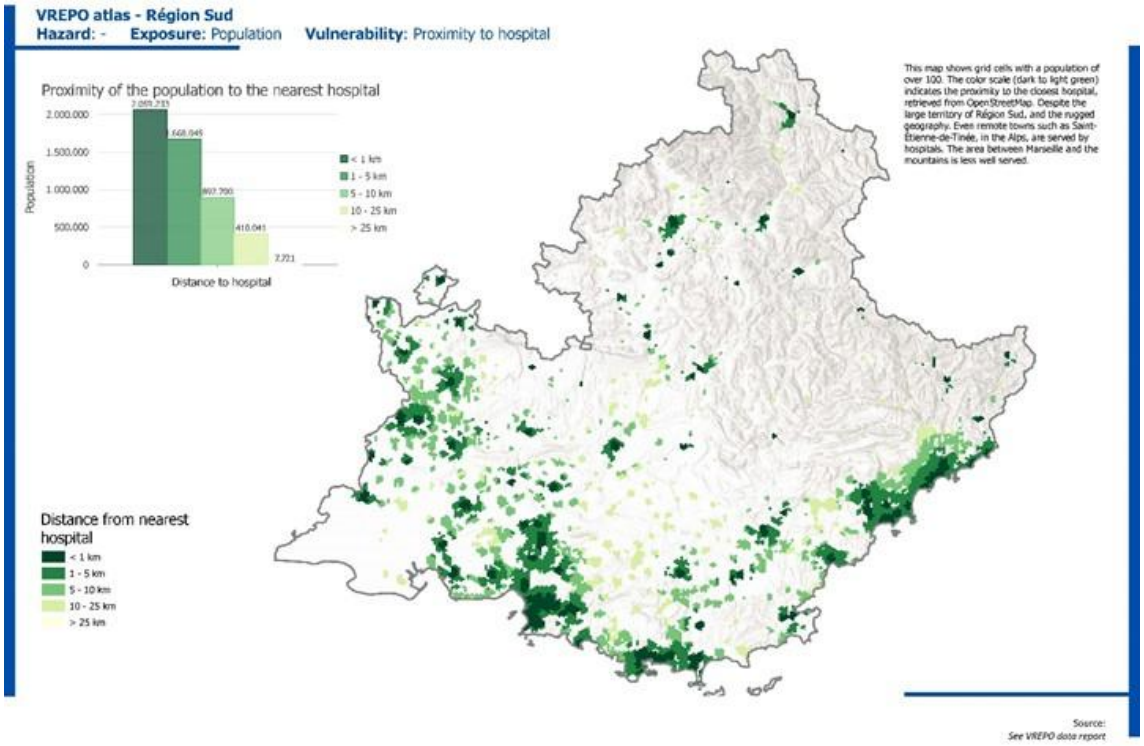


Figure 6 Population Distribution and Hospital Accessibility in Région Sud

The analysis of **population distribution and hospital accessibility in Région Sud** shows that healthcare access largely corresponds with population density, with hospitals well positioned in both coastal and Alpine areas. Remote mountain towns, such as Saint-Étienne-de-Tinée, demonstrate strong coverage despite challenging terrain, while the corridor between **Marseille and the nearby mountains** appears under-served. This highlights the need for targeted healthcare improvements and better emergency response planning. Key policy priorities include closing service gaps in intermediate zones, maintaining access for remote communities, strengthening emergency transport systems, and regularly updating accessibility data to adapt to demographic and infrastructural changes.

2.2.1.3 Lithuania

The Lithuania dataset contains indicators grouped into three dimensions:

- **Hazards**: Fluvial Flood Score, Flood Risk Categories, Wildfire Risk, Heatwave Frequency

- **Ecological Vulnerabilities**: Agricultural Land Area, Urban Green Spaces, Built-up Surfaces
- **Social Vulnerabilities**: Population Density, Vulnerable Populations, Elderly Share, Foreign-born Share

Table 8 Lithuania Spatial Indicators

Category	Indicator	Expanded Description
Hazards	fluvial_flood_score	Measures potential flooding intensity from river systems; supports infrastructure and ecosystem-based flood management.
	flood_risk_cat	Categorises flood risk by severity, identifying zones requiring protective or adaptive measures.
	wildfire_risk	Indicates wildfire-prone areas based on land cover and historical occurrences; essential for prevention and fire management planning.
	heat_waves	Records frequency and intensity of heatwaves; used for assessing climate vulnerability and health risks.
Ecological Vulnerabilities	area_agri_parcel	Measures agricultural land coverage; identifies areas sensitive to drought, flooding, or soil degradation.
	urban_green_area	Quantifies urban vegetation; green areas reduce heat exposure and enhance urban resilience.
	built_area	Represents the footprint of built-up surfaces, used to assess urban exposure and imperviousness.
Social Vulnerabilities	population	Total and spatial distribution of inhabitants; informs emergency preparedness and service allocation.
	vulnerable_pop	Identifies socially vulnerable groups (e.g., elderly, low-income, disabled) more affected by crises.
	elderly_pct	Percentage of elderly residents; indicates age-related vulnerability to heat and mobility challenges.
	foreigners_pct	Share of foreign-born residents; may indicate communication and integration challenges in risk communication.

With these indicators, the following map and graph can be created. Other combinations between the indicators are possible after further data analysis.

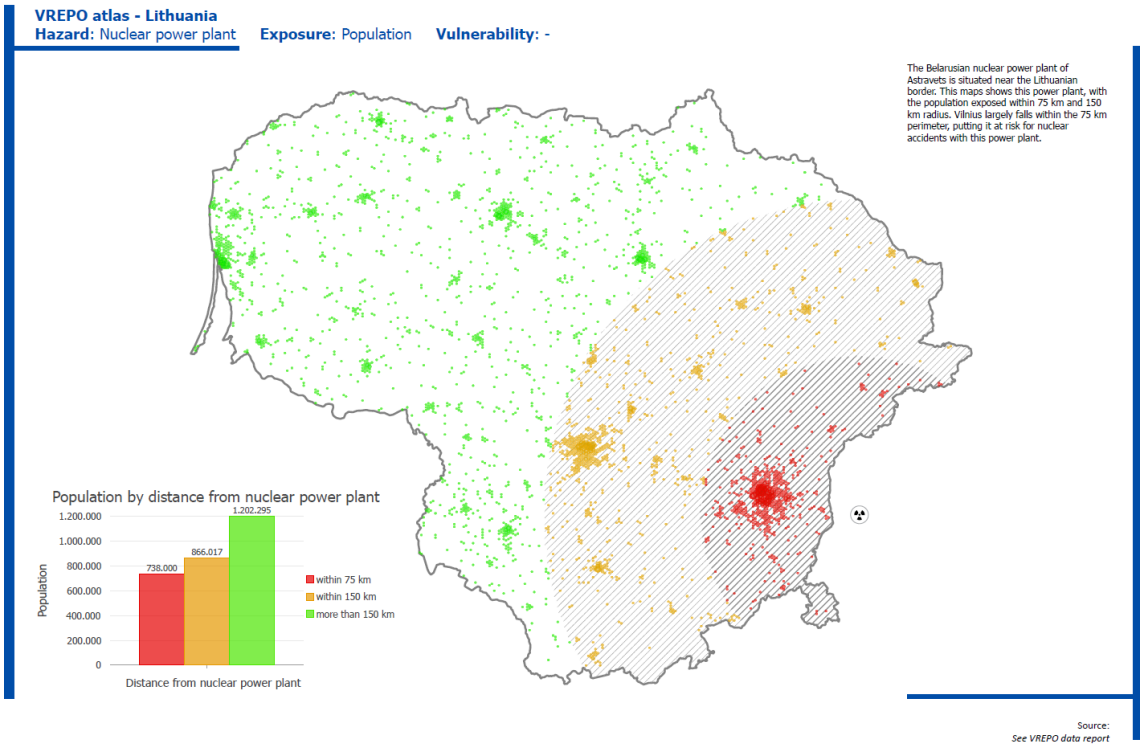


Figure 7 Astravets Nuclear Power Plant and Population Exposure

The **Belarusian nuclear power plant in Astravets**, located near the **Lithuanian border**, poses potential cross-border risks, as a significant portion of **Vilnius's population** lies within the **50 km high-risk zone**. The map illustrates populations within **50 km and 100 km radii**, representing areas of immediate and secondary exposure based on radiation spread dynamics, wind patterns, and potential impacts on people, infrastructure, and ecosystems. Using the **interactive VREPO dataset**, policymakers can adjust parameters like population density or proximity to natural resources to simulate various risk scenarios and enhance preparedness. Key policy priorities include strengthening **emergency planning** and **evacuation strategies** within 50 km, promoting **cross-border cooperation and monitoring**, and integrating **population, environmental, and meteorological data** into comprehensive nuclear risk assessments.

2.2.1.4 Enschede

The dataset for Enschede integrates more than 40 spatial indicators, grouped into four main categories:

- **Hazards** – including fluvial flood risk, heat wave exposure, drought potential, wildfire risk, and distance to nuclear power plants.
- **Critical Infrastructure** – including hospitals, energy facilities, industrial risk sites, military areas, banks, government and public service buildings, train stations, and road network classes. Building stock (number and construction year) is also included as part of infrastructure exposure.
- **Ecological / Environmental Indicators** – including land cover types, urban green areas, agricultural parcels, Natura2000 protected zones, and biodiversity intactness.

- **Social Vulnerabilities** – including population density, age structure (% elderly, % youth), foreign nationality, urbanisation degree, urban fabric, and social vulnerability indices (general and for elderly populations).

Table 9 Enschede Spatial Indicators

Category	Indicator	Expanded Description
Hazards	pluvial_flood_risk	Flooding from heavy rainfall and urban runoff; important for local stormwater management.
	heat_risk	Urban heat exposure; affects health and infrastructure during heatwaves.
Critical Infrastructure	transport_network	Roads, railways, and public transport; essential for emergency mobility.
	utilities	Electricity, water, and communication infrastructure; vital for maintaining basic services.
Social & Ecological Vulnerabilities	population_density	Concentration of residents; higher density increases potential impact.
	vulnerable_groups	Identifies low-income, elderly, or socially isolated populations; priority for targeted interventions.
	green_spaces	Urban parks and natural areas; provide cooling, infiltration, and recreation benefits.
	housing_quality	Measures building condition; lower-quality housing increases disaster vulnerability.

With these indicators, the following map and graph can be created. Other combinations between the indicators are possible after further data analysis.

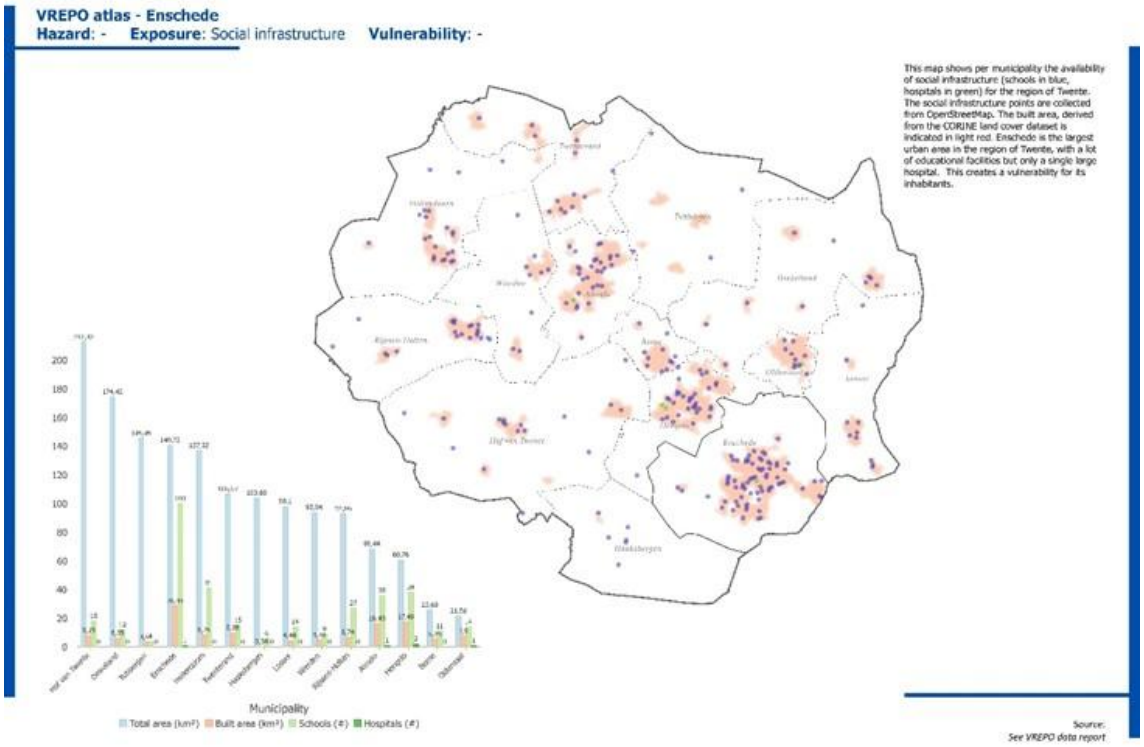


Figure 8 Map of Social Infrastructure Availability in Twente
Indicators: Built-up areas; Hospital and schools locations

The map of social infrastructure in the Twente region presents the spatial distribution of schools and hospitals over built-up areas, integrating data from OpenStreetMap and the CORINE land cover dataset. It reveals that Enschede, the region's main urban center, hosts a high concentration of schools but only one major hospital, creating a potential vulnerability in healthcare accessibility if demand exceeds capacity or services are too centralized. Other municipalities show lower densities of both schools and hospitals, reflecting uneven service distribution across Twente. Policy implications include expanding or decentralizing healthcare capacity in Enschede, evaluating hospitals by capacity and preparedness rather than count, ensuring equitable access to education and health services throughout the region, and employing composite spatial indicators to better capture multi-dimensional aspects of service accessibility and vulnerability.

2.2.1.5 Malta

The Malta dataset integrates indicators in three categories:

- **Hazards**: Fluvial Flood Risk
- **Critical & Social Infrastructure**: Population, Buildings, Schools, Hospitals, Wastewater Treatment Plants, Energy Infrastructure
- **Environmental & Social Vulnerabilities**: Land Cover, Natural Areas, Biodiversity, Demographics, Rural–Urban Classification

Table 10 Malta Spatial Indicators

Category	Indicator	Expanded Description
Hazard	fluvial_flood_risk	Flood risk from short, intense rainfall events causing flash flooding in valleys and urban areas.
Critical & Social Infrastructure	population	Spatial distribution of residents; indicates exposure and potential evacuation needs.
	buildings	Number and density of buildings; identifies built-up zones most at risk.
	schools	Educational institutions; critical community assets during and after crises.
	hospitals	Health infrastructure; central for emergency response and service continuity.
	wastewater_treatment_plant	Sanitation infrastructure; its failure can lead to environmental and health hazards.
	energy_infra	Energy production and distribution sites; disruption affects essential services.
Environmental & Social Vulnerabilities	land_cover	Land use types (urban, agricultural, natural); key for assessing ecosystem functions and hazard exposure.
	natural_areas	Protected and ecologically valuable zones; contribute to biodiversity and natural hazard mitigation.
	biodiversity	Biological diversity index; reflects ecosystem health and adaptive capacity.
	demographics	Population characteristics (age, dependency ratios); indicate social vulnerability.
	rural_urban_class	Degree of urbanisation; differentiates between urban, peri-urban, and rural exposure.

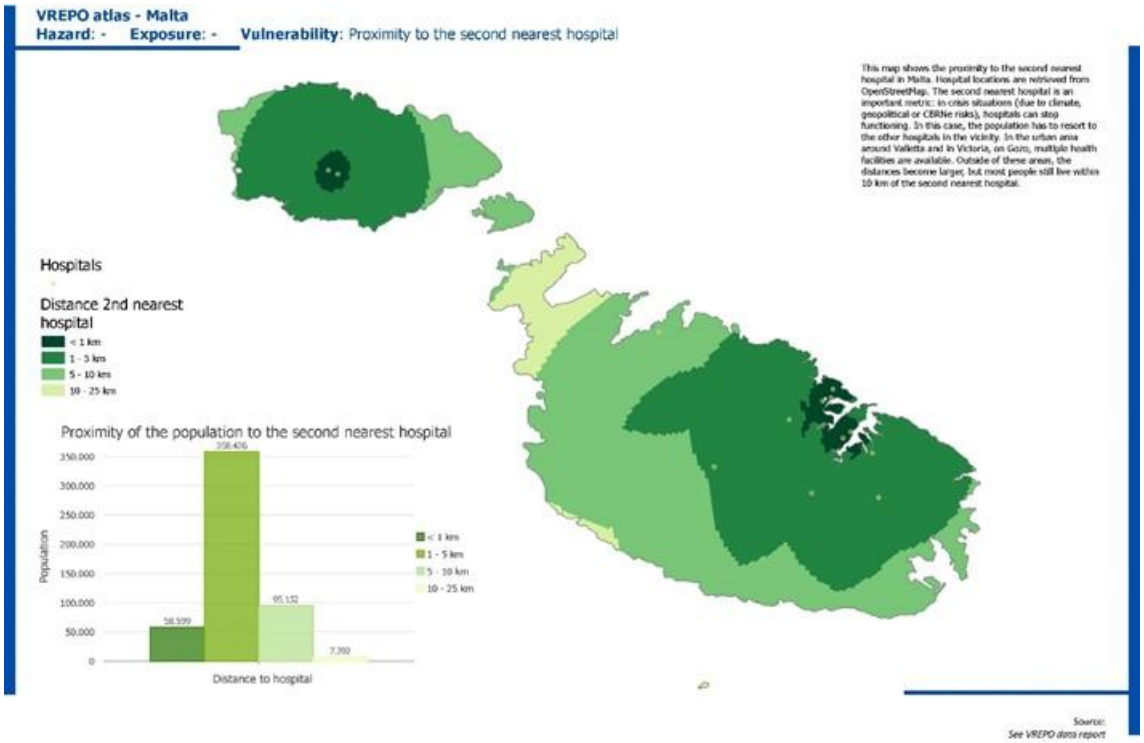


Figure 9 Proximity to the Second Nearest Hospital in Malta
Indicators: Hospital locations, population distribution proximity to the Second Nearest Hospital

The **map of Malta's healthcare network redundancy** assesses how close residents are to their **second nearest hospital**, offering insight into the system's **resilience and backup capacity** in case the nearest facility becomes unavailable due to **climate events, geopolitical disruptions, or CBRNe incidents**. By combining hospital location data, population distribution, and spatial proximity analysis, the map identifies areas where access to alternative healthcare is limited. Findings show that **urban centers around Valletta and Victoria (Gozo)** have strong redundancy and rapid access to multiple hospitals, while **rural and peripheral regions** face longer travel distances to secondary facilities, indicating potential gaps in emergency accessibility. Policy priorities include **strengthening healthcare redundancy**, **investing in under-served areas**, integrating **redundancy mapping into national preparedness strategies**, and ensuring **equitable, resilient healthcare access** across Malta.

2.3 Policy Assessment

This section addresses **Policy Question 2**: *How effective are strategies and instruments in addressing crises of the living environment across the stakeholder territories?*

Building resilient territories requires more than indicators and maps—it also requires understanding how existing policies and strategies are implemented in practice. These instruments provide the institutional and operational framework in which resilience is planned, managed, and executed. By reviewing national, regional, and local frameworks—including climate adaptation plans, disaster risk reduction strategies, spatial planning

policies, and sectoral instruments—this analysis links quantitative evidence with the governance mechanisms that shape responses to hazards.

For each of the five stakeholder regions—**Flanders, Région SUD, Lithuania, Enschede, and Malta**—policy documents were systematically reviewed and validated with stakeholders. Strategies were then mapped across **Disaster Management Cycle (DMC) stages** and **risk categories**, as well as to the **Social, Ecological, and Technological (SETS) dimensions**, showing how interventions address environmental, societal, and infrastructural aspects of resilience. This mapping identifies coverage patterns, gaps, and opportunities, especially regarding recovery measures, and informs the selection of operational strategies tailored to regional priorities.

The detailed methodology for this review, including document collection, categorization, and evaluation, is described in **Chapter 1.1.2**.

2.3.1.1 Flanders

From the 29 existing strategies identified across the five stakeholder regions, a subset of **19 strategies** was selected as particularly relevant for Flanders. The selection considered:

- **Priority risks** identified in Task 1,
- **Stakeholder input** on local needs, and
- The **territorial context** of Flanders.

Distribution of strategies by risk category and DMC stage:

- **Climate:** 14 strategies (6 Mitigation, 7 Preparedness, 1 Response, 0 Recovery)
- **Geopolitical:** 3 strategies (0 Mitigation, 2 Preparedness, 1 Response, 0 Recovery)
- **Public Health:** 2 strategies (0 Mitigation, 0 Preparedness, 2 Response, 0 Recovery)

The relatively small number of strategies reflects the **limited number of policy documents provided** for Flanders and **gaps in coverage** across some risk domains and DMC stages.

Figure 10 shows the distribution of these 19 strategies across DMC stages and risk categories. Grey cells indicate areas where **no existing strategies are in place**, highlighting policy gaps, while white cells indicate the

strategies currently implemented. This visualization is intended to **identify coverage gaps** rather than evaluate the effectiveness of policy implementation.[8]

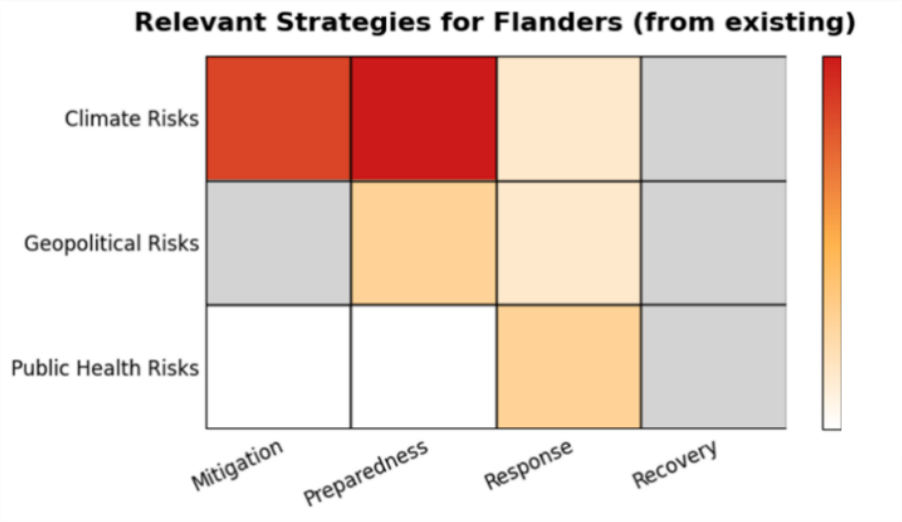


Figure 10 Heatmap showing the distribution of existing strategies across DMC stages and risk categories in Flanders. The darker red gradient denotes a greater number of existing strategies. Grey cells indicate that no existing strategies are present.

2.3.1.2 Region SUD

From the 29 existing strategies identified across the five stakeholder regions, a subset of **26 strategies** was selected as particularly relevant for Région SUD. The selection was guided by:

- **Priority risks** identified in Task 1,
- **Stakeholder input** on local needs, and
- The **territorial context** of Région SUD.

Distribution of strategies by risk category and DMC stage:

- **Climate:** 16 strategies (9 Mitigation, 6 Preparedness, 1 Response, 0 Recovery)
- **Geopolitical:** 5 strategies (0 Mitigation, 3 Preparedness, 2 Response, 0 Recovery)
- **Public Health:** 5 strategies (0 Mitigation, 2 Preparedness, 3 Response, 0 Recovery)

Figure 11 shows the distribution of these strategies across the DMC stages and primary risk categories. Grey cells indicate areas where **no strategies currently exist**, highlighting policy gaps, while white cells indicate areas where strategies—such as Public Health mitigation measures—are already in place. This visualization is intended to **highlight coverage gaps** rather than evaluate the effectiveness of policy implementation[8].

[8] For policymakers who want full transparency or wish to explore all strategies in detail, the **intermediate deliverable ID3 – List of Operational Strategies (May 16, 2025)** provides a structured Excel file with all **97 strategies**, including document type, scope, and policy issues. This deliverable allows readers to see how the 19 strategies for Flanders were derived from the broader set.

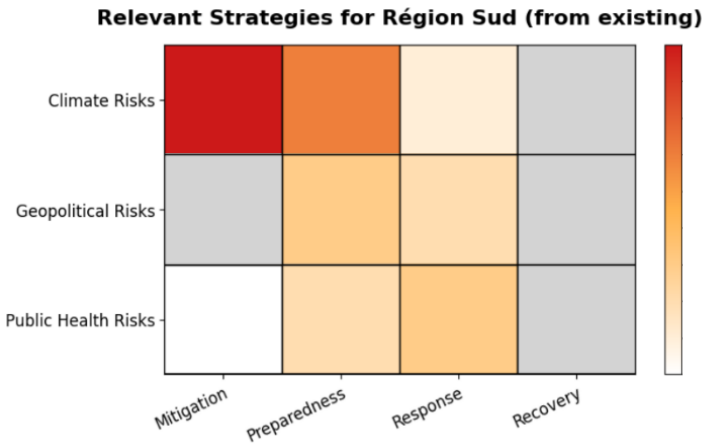


Figure 11 Heatmap showing the distribution of existing strategies across DMC stages and risk categories in Region Sud. The darker red gradient denotes a greater number of existing strategies. Grey cells indicate that no existing strategies are present.

2.3.1.3 Lithuania

From the 29 existing strategies identified across the five stakeholder regions, a subset of **25 strategies** was selected as particularly relevant for Lithuania. The selection was guided by:

- **Priority risks** identified in Task 1,
- **Stakeholder input** on local needs, and
- The **territorial context** of Lithuania.

Distribution of strategies by risk category and DMC stage:

- **Climate:** 14 strategies (8 Mitigation, 6 Preparedness, 0 Response, 0 Recovery)
- **Geopolitical:** 5 strategies (0 Mitigation, 3 Preparedness, 2 Response, 0 Recovery)
- **Public Health:** 6 strategies (1 Mitigation, 2 Preparedness, 3 Response, 0 Recovery)

Figure 12 shows the distribution of these strategies across the DMC stages and primary risk categories. Grey cells indicate areas where **no strategies currently exist**, highlighting policy gaps, while white cells indicate

areas where strategies—such as Climate strategies in the Response stage—are already in place. This visualization is intended to **highlight coverage gaps** rather than evaluate the effectiveness of policy implementation[8].

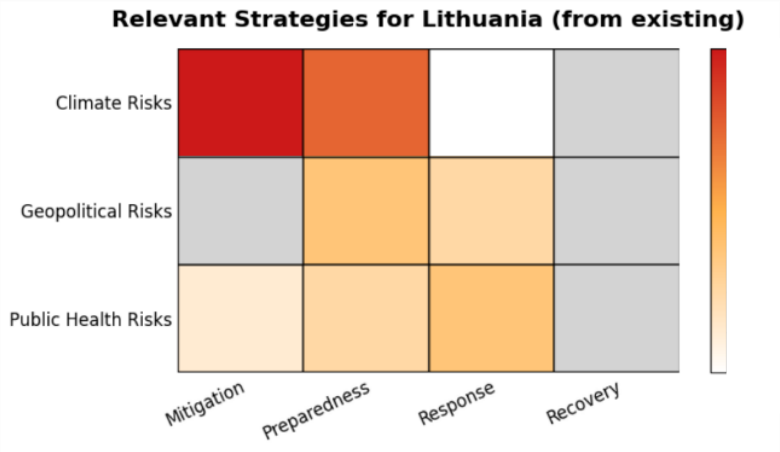


Figure 12 Heatmap showing the distribution of existing strategies across DMC stages and risk categories in Lithuania. The darker red gradient denotes a greater number of existing strategies. Grey cells indicate that no existing strategies are present.

2.3.1.4 Enschede

From the 29 existing strategies identified across the five stakeholder regions, a subset of **20 strategies** was selected as particularly relevant for Enschede. The selection was guided by:

- **Priority risks** identified in Task 1,
- **Stakeholder input** on local needs, and
- The **territorial context** of Enschede.

Distribution of strategies by risk category and DMC stage:

- **Climate:** 13 strategies (7 Mitigation, 5 Preparedness, 1 Response, 0 Recovery)
- **Geopolitical:** 2 strategies (0 Mitigation, 1 Preparedness, 1 Response, 0 Recovery)
- **Public Health:** 5 strategies (1 Mitigation, 2 Preparedness, 2 Response, 0 Recovery)

Figure 13 shows the distribution of these strategies across the DMC stages and primary risk categories. Grey cells indicate areas where **no strategies currently exist**, highlighting **policy gaps**. This visualization is intended to **highlight coverage gaps** rather than evaluate the effectiveness of policy implementation[8].

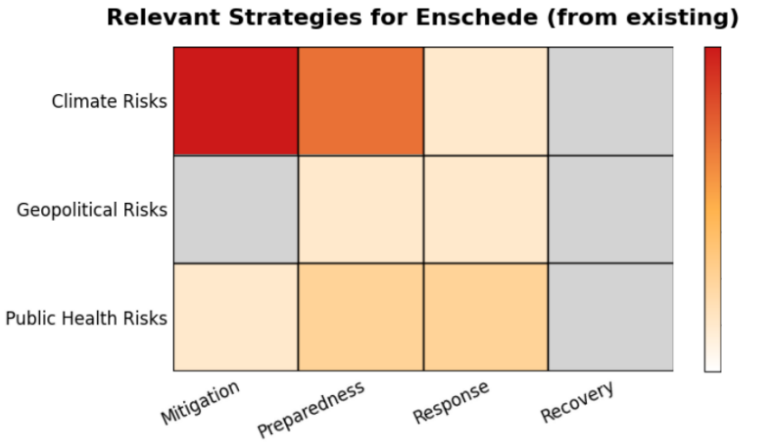


Figure 13

Figure 13 Heatmap showing the distribution of existing strategies across DMC stages and risk categories in Enschede. The darker red gradient denotes a greater number of existing strategies. Grey cells indicate that no existing strategies are present.

2.3.1.5 Malta

From the 29 existing strategies identified across the five stakeholder regions, a subset of **19 strategies** was selected as particularly relevant for Malta. The selection was guided by:

- **Priority risks** identified in Task 1,
- **Stakeholder input** on local needs, and
- The **territorial context** of Malta.

Distribution of strategies by risk category and DMC stage:

- **Climate:** 11 strategies (6 Mitigation, 4 Preparedness, 1 Response, 0 Recovery)
- **Geopolitical:** 3 strategies (0 Mitigation, 2 Preparedness, 1 Response, 0 Recovery)
- **Public Health:** 5 strategies (1 Mitigation, 1 Preparedness, 3 Response, 0 Recovery)

Figure14 shows the distribution of these strategies across the DMC stages and primary risk categories. Grey cells indicate areas where **no strategies currently exist**, highlighting **policy gaps**. This visualization is intended to **highlight coverage gaps** rather than evaluate the effectiveness of policy implementation[8].

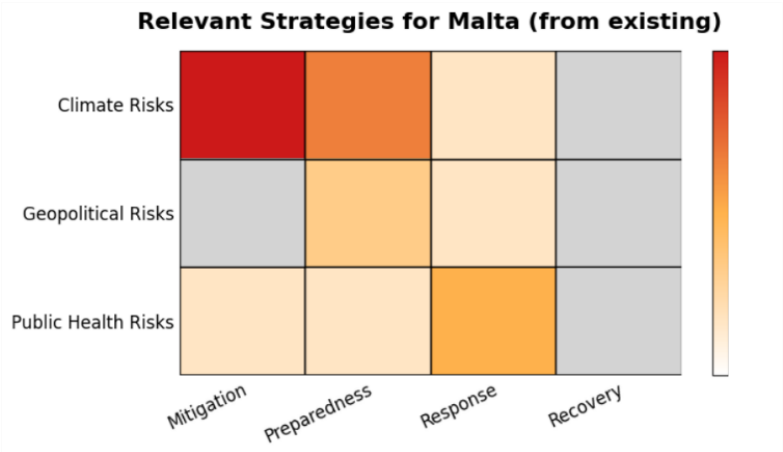


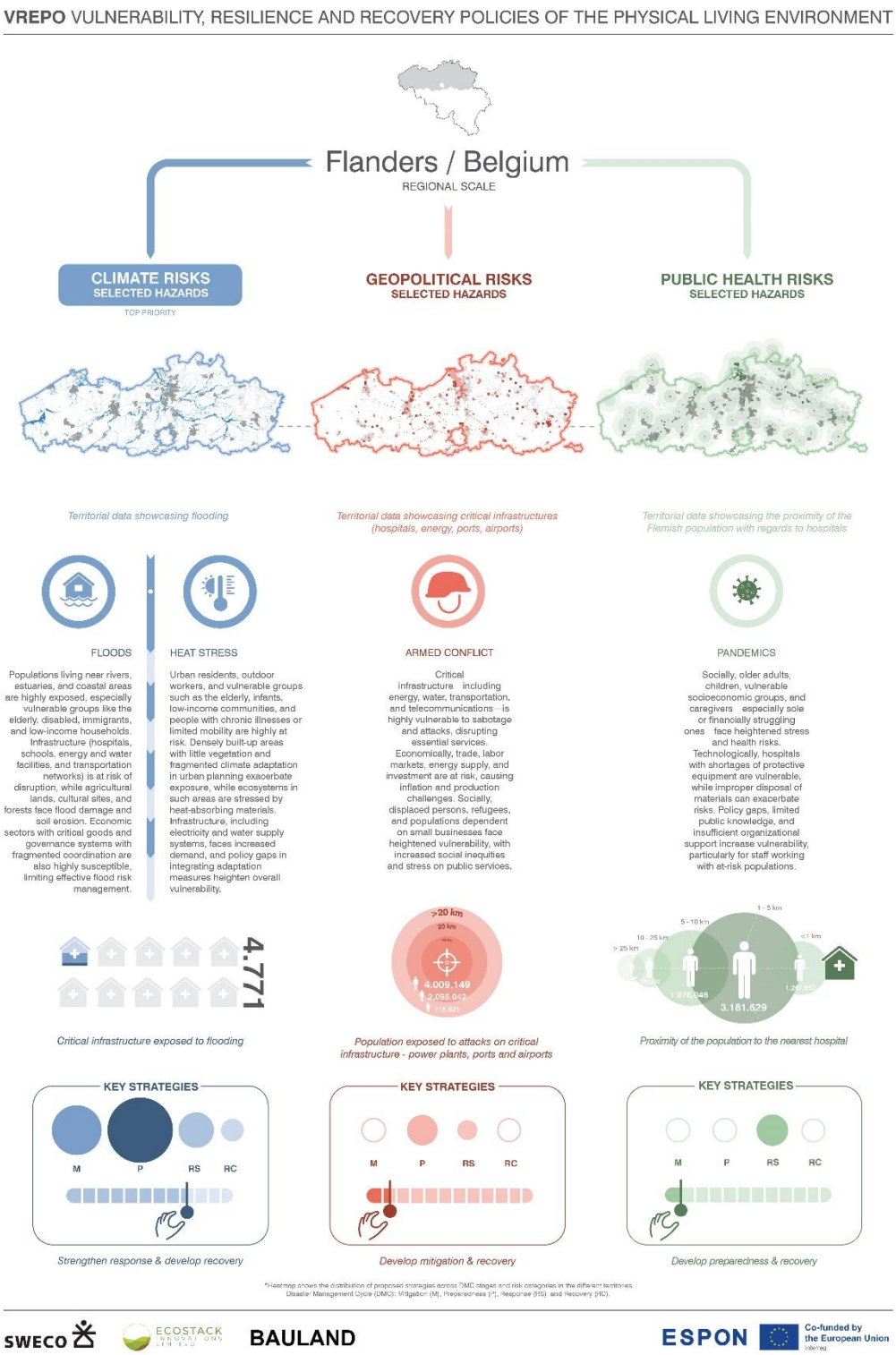
Figure 14 Heatmap showing the distribution of existing strategies across DMC stages and risk categories in Malta. The darker red gradient denotes a greater number of existing strategies. Grey cells indicate that no existing strategies are present.

2.4 Visual Synthesis of Project Results

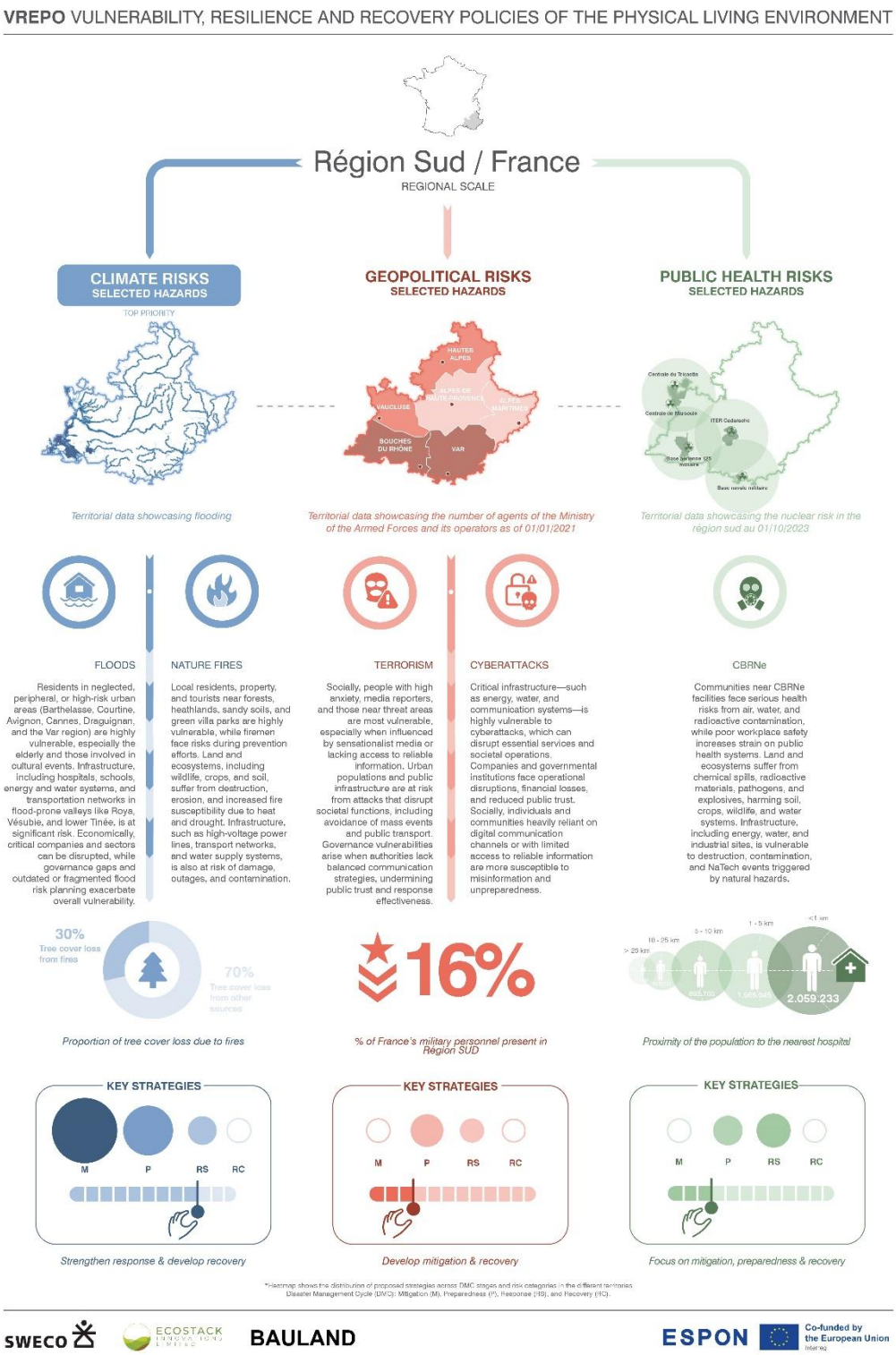
To effectively communicate the main outputs of the project, **five region-specific posters** were developed, one for each stakeholder territory. These posters provide a **concise and visually engaging synthesis** of the project's core results, drawing on the conceptual framework and including examples of indicators, mapping outputs, and policy assessments. The analysis focused on the three main risk categories: **climate, geopolitical, and public health risks**. While the posters offer a **light summary of project results**, they highlight key insights on territorial vulnerabilities, hazard exposure, and resilience strategies relevant to each region (from existing strategies).

By presenting a clear overview of each territory's vulnerabilities, hazards, and resilience potential, the posters create a **shared platform for discussion, prioritization, and collaborative planning**, making them a critical tool for both communication and policy development. **Importantly, they are directly linked to the territorial resilience recommendations** presented in the Policy Recommendations chapter, helping to translate the assessment of risks and vulnerabilities into **practical, context-specific actions** for policymakers.

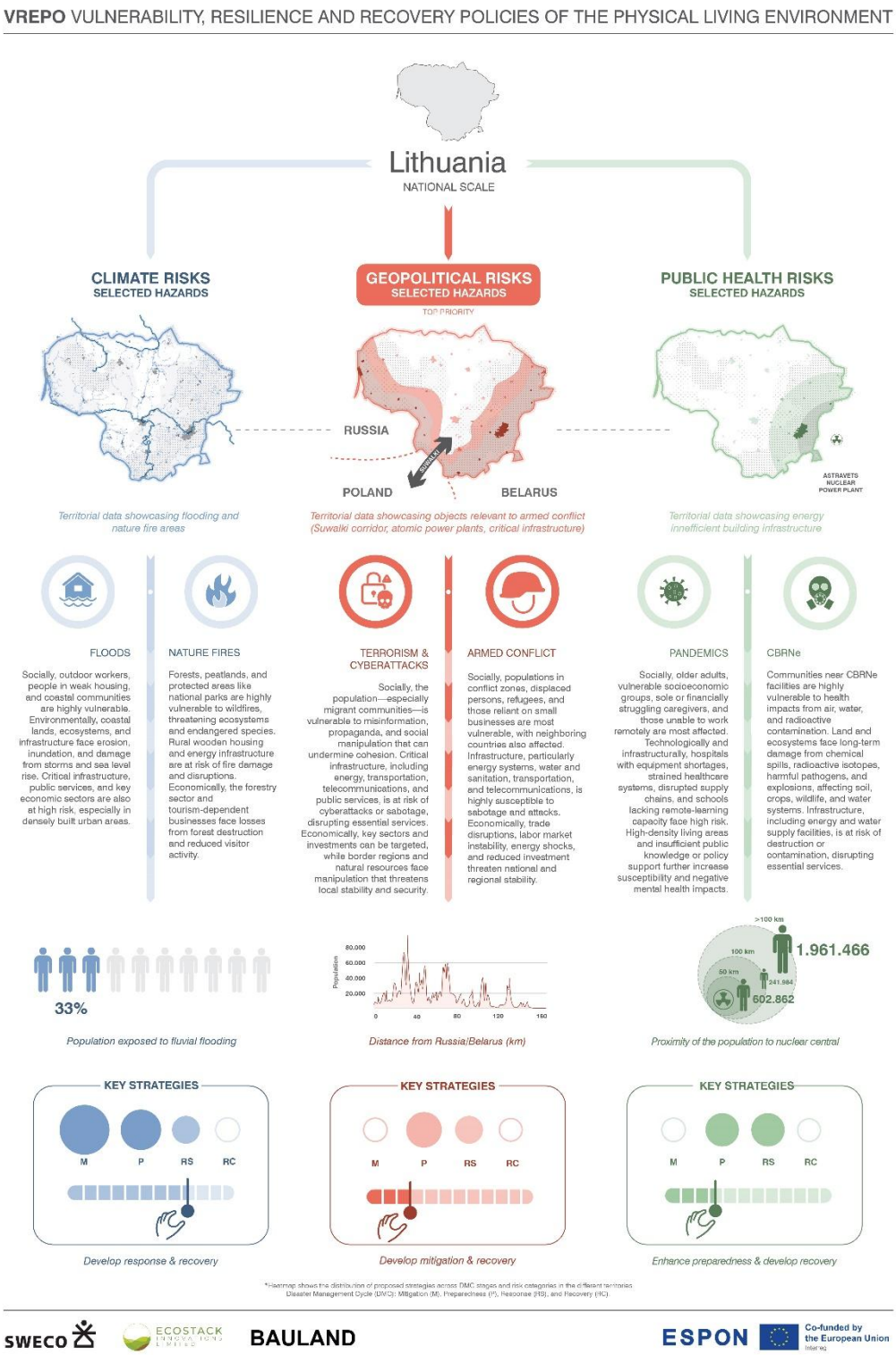
2.4.1.1 Flanders



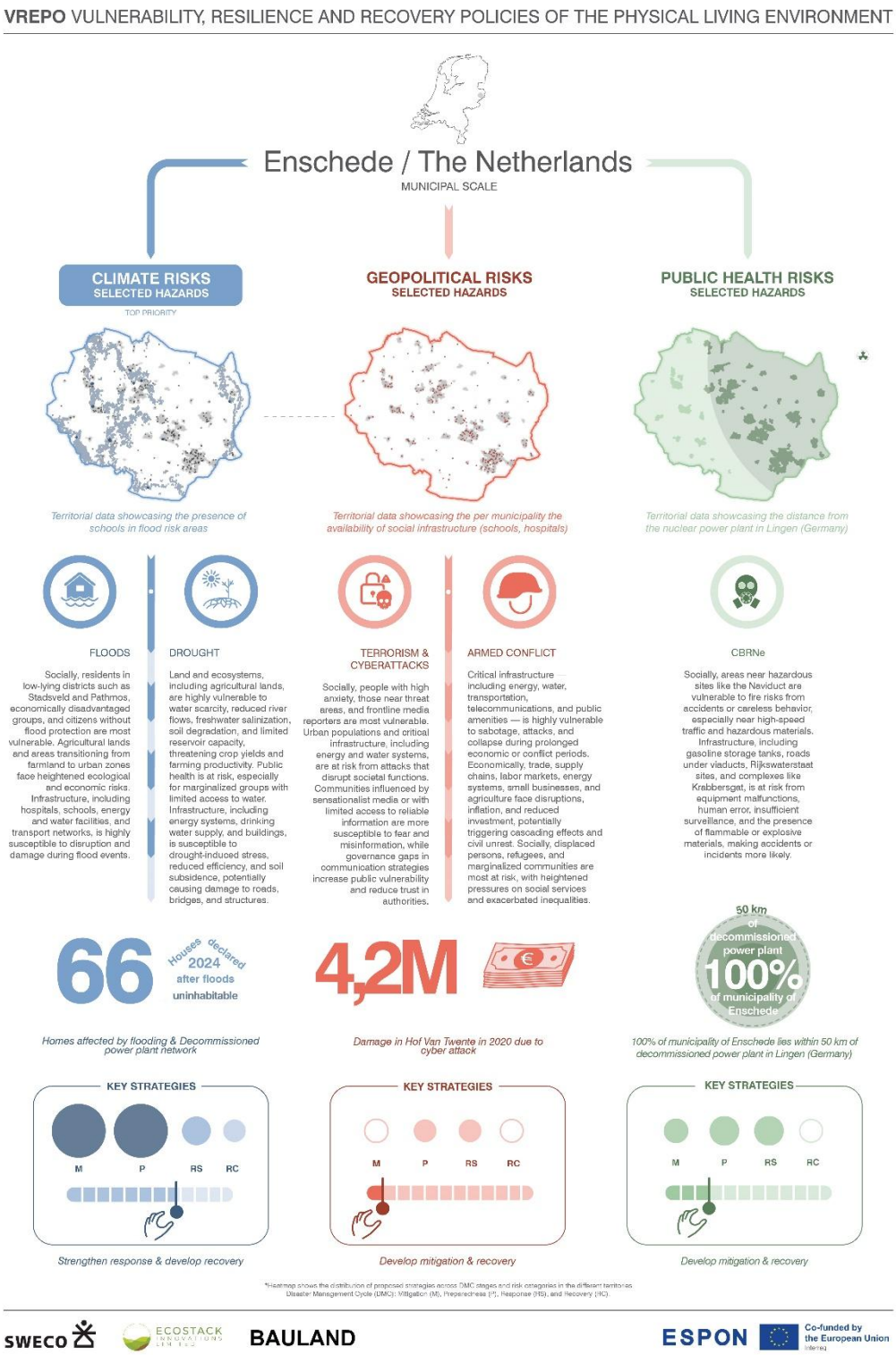
2.4.1.2 Region SUD



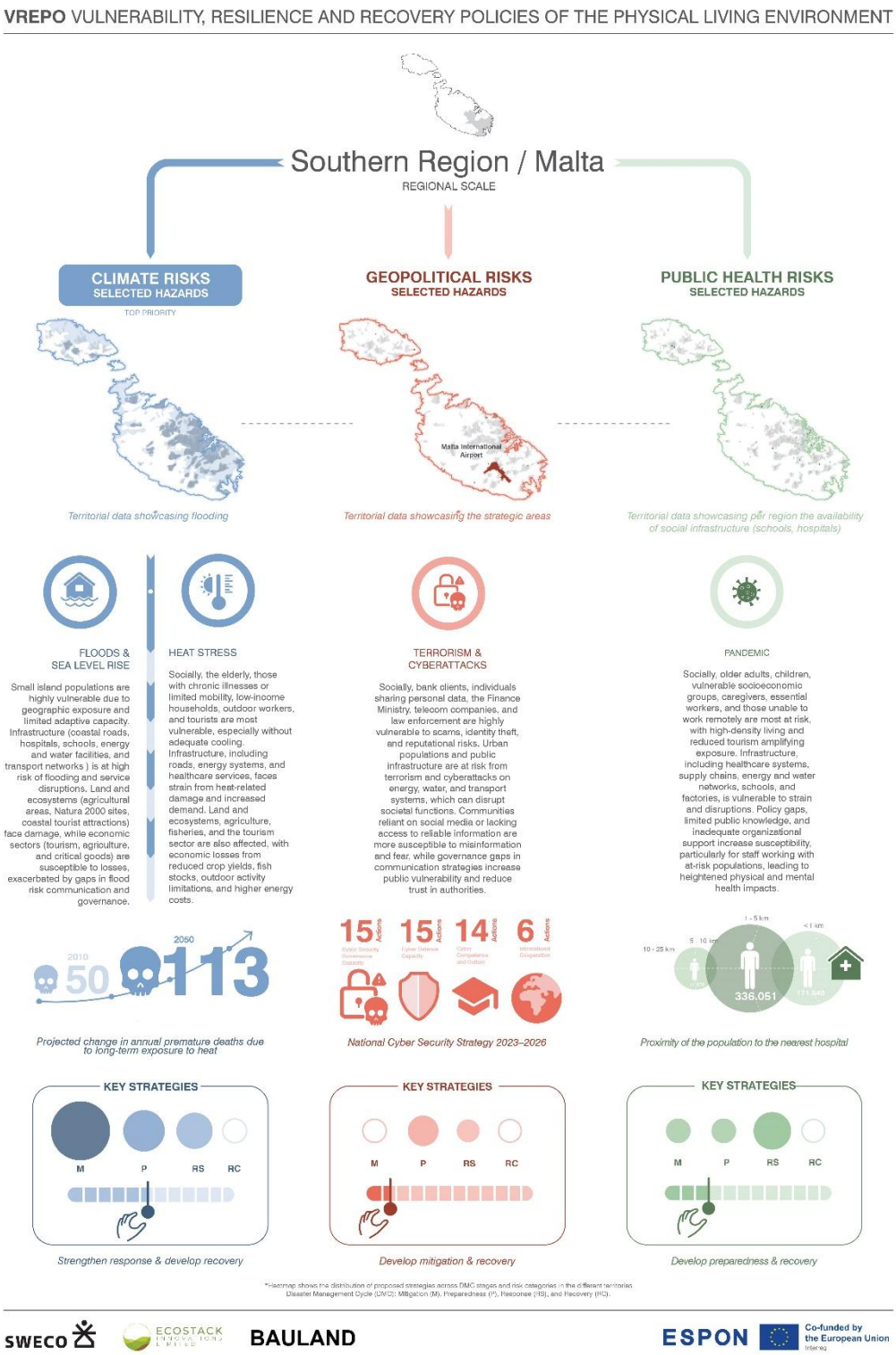
2.4.1.3 Lithuania



2.4.1.4 Enschede



2.4.1.5 Malta


VREPO VULNERABILITY, RESILIENCE AND RECOVERY POLICIES OF THE PHYSICAL LIVING ENVIRONMENT
Southern Region / Malta
REGIONAL SCALE
CLIMATE RISKS
SELECTED HAZARDS
TOP PRIORITY
GEOPOLITICAL RISKS
SELECTED HAZARDS
PUBLIC HEALTH RISKS
SELECTED HAZARDS
Malta International Airport
Territorial data showcasing flooding
Territorial data showcasing the strategic areas
Territorial data showcasing per region the availability of social infrastructure (schools, hospitals)
FLOODS & SEA LEVEL RISE
Small island populations are highly vulnerable due to geographic exposure and limited adaptive capacity. Infrastructure (coastal roads, hospitals, schools, energy and water facilities, and transport networks) is at high risk of flooding and service disruptions. Land and ecosystems (agricultural areas, Natura 2000 sites, coastal tourist attractions) face damage, while economic sectors (tourism, agrioulture, and critical goods) are susceptible to losses, exacerbated by gaps in flood risk communication and governance.
HEAT STRESS
Socially, the elderly, those with chronic illnesses or limited mobility, low-income households, outdoor workers, and tourists are most vulnerable, especially without adequate cooling. Infrastructure, including roads, energy systems, and healthcare services, faces strain from heat-related damage and increased demand. Land and ecosystems, agriculture, fisheries, and the tourism sector are also affected, with economic losses from reduced crop yields, fish stocks, outdoor activity limitations, and higher energy costs.
TERRORISM & CYBERATTACKS
Socially, bank clients, individuals sharing personal data, the Finance Ministry, telecom companies, and law enforcement are highly vulnerable to scams, identity theft, and reputational risks. Urban populations and public infrastructure are at risk from terrorism and cyberattacks on energy, water, and transport systems, which can disrupt societal functions. Communities reliant on social media or lacking access to reliable information are more susceptible to misinformation and fear, while governance gaps in communication strategies increase public vulnerability and reduce trust in authorities.
PANDEMIC
Socially, older adults, children, vulnerable socioeconomic groups, caregivers, essential workers, and those unable to work remotely are most at risk, with high-density living and reduced tourism amplifying exposure. Infrastructure, including healthcare systems, supply chains, energy and water networks, schools, and factories, is vulnerable to strain and disruptions. Policy gaps, limited public knowledge, and inadequate organizational support increase susceptibility, particularly for staff working with at-risk populations, leading to heightened physical and mental health impacts.
2010
50
2050
113
Projected change in annual premature deaths due to long-term exposure to heat
15 Actions
15 Actions
14 Actions
6 Actions
National Cyber Security Strategy 2023–2026
1 - 5 km
< 1 km
5 - 10 km
10 - 25 km
336.051
Proximity of the population to the nearest hospital
KEY STRATEGIES
M
P
RS
RC
Strengthen response & develop recovery
KEY STRATEGIES
M
P
RS
RC
Develop mitigation & recovery
KEY STRATEGIES
M
P
RS
RC
Develop preparedness & recovery
SWECO
ECOSTACK
BAULAND
ESPON
Co-funded by the European Union

Finally, the **territorial resilience recommendations** presented in **Policy recommendations** chapter are directly informed by the conceptual framework described above and the different results. By applying the integrated **SETS-based approach** across the **Disaster Management Cycle (DMC) stages**—mitigation, preparedness, response, and recovery—the recommendations translate the assessment of hazards, vulnerabilities, and exposures into **practical, context-specific actions**. For each of the three main risk categories, the framework ensures that proposed measures are aligned with the **specific needs and priorities** of the territories under study, providing policymakers with a **structured and actionable feedback** to enhance regional resilience.

2.5 Policy Recommendations

The risk maps examples in Section 1.4 illustrate where and how the regions are most exposed to climate, geopolitical, and public health threats across the social, ecological, and technological systems. They provide examples of the geographies and sectors most at risk, from flood-prone urban areas to drought-sensitive ecosystems and critical infrastructure hubs. Additionally, gaps in territorial resilience policy strategies are identified across the DMC stages in Section 1.5. Building on this evidence, for each region we develop **nine recommendation tables** (one for each risk category and SETS dimension combination – refer to the regional reports in the respective Annexes **Error! Reference source not found.** to **Error! Reference source not found.**). Together, they provide targeted actions for each risk category while also laying the groundwork for cross-sectoral and public–private collaboration.

For each of the three risk categories and SETS dimensions (3x3) we present territorial policy recommendations across the DMC stages for each region using the structure presented in Table 11. Each recommendation is structured around three components to make recommendation practical and actionable:

- **Content ("what")** - refers to what the policy recommendation aims to address.
- **Instruments ("how")** - are the tools and mechanisms used to implement and enforce the policy recommendation.
- **Key Actors ("who") -** covers the potential initiators, responsibilities, and coordination needed to guide implementation.

Table 11 The table structure used to present the policy recommendations. For each risk category, 3 tables, one for each SETS dimension, is developed, resulting in a total of 9 tables for each region.

DMC Phase	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*			
Preparedness *(ensure readiness before hazards occur)*			
Response *(immediate actions during/after hazards)*			
Recovery			

(rebuild stronger & more resilient)			

Each table provides targeted recommendations aligned with governance instruments such as legislation, plans, zoning policies, subsidies, and softer tools like guidelines and awareness campaigns, ensuring that the strategies are actionable and tailored to the respective region. The tables were developed through a multi-step, evidence-based process to ensure their relevance and practicality for each region.

By combining these insights, the analysis highlights **critical opportunities to enhance resilience and provides actionable policy recommendations tailored to the social, ecological, and technological aspects of the region's risk management across the DMC stages**. It consolidates critical information on specific instruments, governance roles, and implementation steps, enabling spatial planners and policymakers to quickly identify priority actions and responsible actors. This resource is intended to support policy development coordinate across sectors, and design integrated responses tailored to local risks and capacities. However, it is important to recognize the limitations of this study: as an external analysis conducted without on-the-ground presence, some local nuances, socio-political dynamics, and emerging issues may not be fully captured. This guidance needs, therefore, to be supplemented with local expertise and continuous stakeholder engagement to ensure effective and context-sensitive application. In the following sections we synthesize the **common recommendations across all 5 regions** and **across climate, geopolitical, and public health risks**, grouped by **SETS** and aligned with the **disaster management cycle**.

2.5.1 Common Recommendations Across Regions

The five regional assessments (Flanders, Enschede, Région SUD, Lithuania, and Malta) show that while the **hazards differ,** and include floods, droughts, wildfires, and heatwaves to cyberattacks, terrorism, and pandemics—their impacts converge on the same **critical infrastructures and communities**. Hospitals, schools, utilities, ports, and transport corridors are repeatedly exposed, while vulnerable populations (elderly, low-income, migrants) and ecological buffers (wetlands, forests, coastal zones) face compounding pressures. This synthesis sets out **common recommendations across climate, geopolitical, and public health risks**, grouped by the **social, environmental, and technological dimensions** and aligned with the **disaster management cycle**.

These recommendations should be considered in the context that some are already being implemented—fully, partially, or to varying degrees—in certain regions.

2.5.1.1 Mitigation – reducing systemic risk before crises occur

System	Recommended Measures
Social systems	1. Retrofitting schools, hospitals, and municipal halls as *multiple-use facilities* that function daily as education or health sites but can rapidly switch into shelters, vaccination hubs, or cooling spaces during crises. 2. Updating building codes to require *insulation, passive cooling, and rainwater harvesting*, preventing dense neighbourhoods from becoming heat islands or flood hotspots.
Environmental systems	1. Restoring and maintaining *floodplains, wetlands, dunes, and urban green corridors* as natural buffers to reduce flood, drought, and heat risks, while enhancing biodiversity and contributing to EU-wide nature restoration goals. 2. Promoting *resilient crops and efficient irrigation* systems to reduce vulnerability to both drought and geopolitical supply shocks.
Technological systems	1. Upgrading *energy, transport, and telecom networks* with redundancy to ensure continuity during floods, cyberattacks, or heatwaves. 2. Equipping *hospitals, water treatment plants, and emergency nodes* with **autonomous utilities**, including *backup systems*—such as reserve power generators, independent communication links, and secure water supplies—that maintain essential functions when primary systems fail. (Backup systems are reserve infrastructures designed to ensure continuity of critical services during disruptions.)

2.5.1.2 Preparedness – equipping systems and societies before shocks

- **Social systems**:
  1. Community resilience registries **should be established** to map local leaders, volunteers, and critical resources.
  2. Vaccination sites and surge health facilities **should be pre-mapped and designed as adaptable spaces** that can be converted and used to support the community in terms of crises, while ensuring equitable access across regions and equitably covering different socio-economic groups within regions.
- **Environmental systems**:
  1. Improved deployments of environmental and ecological monitoring networks with IoT sensors, which can be supported through remote sensing, **should be deployed and mainstreamed** to track pollution, including water and air quality and ecosystem condition, with automated processing offering early warning of climatic, zoonotic, chemical or natural risks.

2. The use of nature-based solutions, such as sponge streets, rain gardens, and wetlands, **can be integrated into urban planning** to give cities anticipatory capacity to absorb rainfall or drought stress.

- **Technological systems**:
  1. Smart resilience dashboards **should be developed** to integrate hazard data (flood, drought, wildfire, cyber) with vulnerability indicators (elderly %, income, density, access to hospitals). These dashboards **can trigger anticipatory action**, such as activating cooling shelters before a heatwave or rerouting transport ahead of storms, while also tracking long-term improvement from baseline conditions for hazards, vulnerability and exposure.
  2. Cross-border protocols **should be formalised** for rivers, coasts, and grids, strengthening shared preparedness.

2.5.1.3 Response – crisis activation and emergency management

- **Social systems**: Crisis communication should be multilingual and multi-channel, building trust and ensuring compliance. Where relevant, **'no-regret' measures**, such as the rapid establishment of temporary refugee villages (e.g., Flanders' response to Ukrainian refugees), can provide immediate support while long-term solutions are developed.
- **Environmental systems**:
  1. Rapid-response ecological units should be created and trained to manage wildfires, chemical contamination, or biothreats.
  2. Urban parks and schoolyards can be used as safe assembly points with shade and WASH facilities to reduce disease spread.
- **Technological systems**:
  1. Lifeline infrastructures should maintain continuity protocols and redundant backups for power, telecoms, and water.
  2. Real-time operations centers and digital infrastructure need to be mainstreamed more widely and activated within regions to bring together civil protection, cyber, energy, and transport operators, issuing unified alerts and coordinated response.
  3. Shelters, once vital community infrastructure, should be modernised to multi-hazard standards, with ventilation, filtration, autonomous power, and real-time occupancy data available to the public.

2.5.1.4 Recovery – building back better, not just rebuilding

- **Social systems**:
  1. Recovery funds **should be tied to equity benchmarks**, ensuring reconstruction and relocation do not deepen inequalities.
  2. Community rebuilding programs **need to focus on social cohesion and inclusion measures**, addressing social and environmental inequalities, displacement impacts and distributive justice (equitable distribution of environmental burdens and benefits), procedural justice (fair and meaningful participation in decision-making processes), and recognition

justice (acknowledging and respecting the experiences and cultures of marginalized communities).

- **Environmental systems**:
    1. Post-crisis ecosystem restoration **should be prioritised**, with wetlands, rivers, and soils rehabilitated as long-term resilience assets.
    2. Leveraging cultural and technological development for improved sustainability**, a**gricultural recovery **should shift toward drought- and flood-resilient practices and focus on low-resource use practices that promote** food security in the long-term, including and particularly important during times of crises.
- **Technological systems**: Recovery **should follow a "Build Back Better[9]" framework**. Low-risk zones host resilient new development; moderate-risk areas require mandatory adaptation; high-risk areas trigger relocation with land reallocation and compensation. New assets **should perform better than those lost**, with resilience benchmarks monitored via digital dashboards.

Across the five territories, the overarching recommendations are: **schools, hospitals, and public spaces should be retrofitted as dual-use hubs; wetlands and floodplains should be restored as ecological buffers; energy and transport corridors should be secured with redundancy; and Build Back Better should guide recovery investments.** These recommendations **can be adapted to different territorial contexts** but are broadly transferable across Europe. [10]

2.6 Good practices

While the cross-regional recommendations show ways to strengthen resilience, the best practices presented in this section provide real-world examples of how these measures can be put into action. These best practices are based on stakeholder feedback from the five regions, contributions from the European Council of Spatial Planners (ECTP-CEU) at the European level and the Executive Committee members (UK, Italy, Ireland, France, Norway, Slovakia, Belgium-Walloon, Austria), project consortium expertise, and additional research. Furthermore, they demonstrate that certain regional priorities to strengthen resilience are already being applied in different contexts. For example, Flanders' water governance, Enschede's layered adaptation, Région SUD's data-driven risk management, Lithuania's shelter standards, and Malta's community-based resilience all provide

[9] Sendai Framework for Disaster Risk Reduction 2015-2030 | UNDRR

[10] These four overarching recommendations—**retrofitting schools, hospitals, and public spaces as dual-use hubs; restoring wetlands and floodplains as ecological buffers; securing energy and transport corridors with redundancy; and applying the "Build Back Better" approach in recovery**—were selected because they consistently emerged across all five territorial assessments as **high-impact, multi-hazard measures**. They address the most critical vulnerabilities across climate, geopolitical, and public health risks while spanning the social, environmental, and technological (SETS) dimensions. These measures were highlighted as **headline recommendations** to provide policymakers with clear, actionable priorities that are broadly transferable across regions, complementing the detailed, region-specific actions presented in Tables 11 and Annexes 4.3–4.7. While not exhaustive, these four interventions illustrate how the detailed evidence base can be translated into **concrete, cross-cutting actions** that enhance resilience throughout the Disaster Management Cycle.

transferable models that can guide action. Additional lessons from the UK, the Netherlands, and Ukraine show how counter-terrorism, defence planning, and integrated climate-conflict resilience can also be embedded in territorial strategies. While contexts differ, several **common themes emerge**, showing where lessons can be transferred and scaled.

Together, these best practices **translate recommendations into operational pathways** — offering tested approaches that Malta, Flanders, Enschede, Région SUD, and Lithuania, as well as other European regions, can adapt to their own contexts.

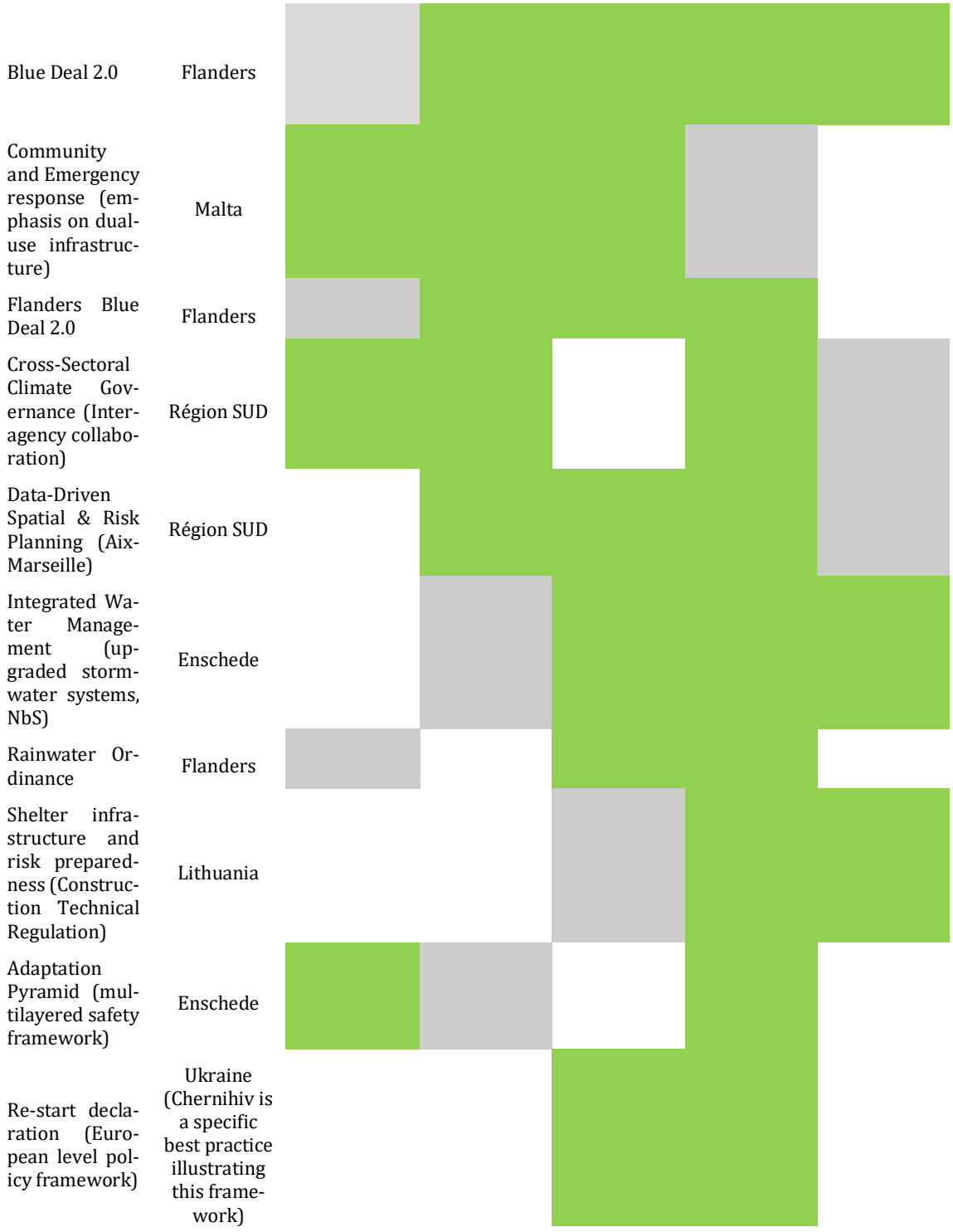
Table 12 presents best practices that apply to at least two of the five regions. They are ordered by the number of regions to which they are relevant, with those at the top representing approaches of broad applicability and those lower down reflecting more context-specific solutions. This structure helps planners and policymakers quickly distinguish best practices that are widely transferable from those requiring more tailored adaptation.

The classification was developed through a combination of stakeholder input and desk research. During a dedicated workshop, stakeholders from each region participated in an interactive Mural board exercise, where they reviewed all best practices and selected those they believed could bring the most benefit to their region. This participatory activity allowed regional representatives to reflect on their local priorities, needs, and existing initiatives, ensuring that the assessment incorporated local expertise and contextual understanding.

Following the workshop, a desk-based analysis was carried out to validate and complement the stakeholder inputs. For each best practice, research was conducted to identify whether similar projects or policies were already being implemented in the target regions. If comparable initiatives were found, the applicability was marked as white, indicating limited added value. If no similar initiative existed and the best practice had demonstrated proven success in its source region, it was marked as green, showing high relevance and transfer potential. Practices that originated from a region were marked as grey to indicate their source.

Table 12 Overview of good practices from Flanders, Enschede, Lithuania, Malta, and Région SUD, and their applicability to the five regions. Green indicates high relevance and applicability of the specific good practice to that region; white indicates low applicability, as a similar project or initiative is already in place; while grey indicates that the good practice originates from that region.

Best Practice	Origin Region	Flanders	Enschede	Lithuania	Malta	Région SUD
Counter-terrorism through spatial planning	United Kingdom					
Community engagement & climate justice ('GroenBlauw Enschede')	Enschede					
Cross-Border Flood Agreement	Flanders					
National Spatial Programme for Defence	Netherlands					



2.6.1 Integrated Water Management and Nature-Based Solutions (NbS)

Context: Flanders' *Rainwater Ordinance* and *Blue Deal 2.0*, and Enschede's *sponge streets, and stormwater buffers* show how NbS paired with regulation reduce flood and drought risks while creating co-benefits for biodiversity and urban liveability.

Relevance: Across regions, floods and droughts consistently threaten both urban and rural areas, with water security and flood safety being critical for resilience.

Transferable lessons: Rainwater harvesting and reuse **should be embedded in building regulations**, wetlands and green corridors **should be restored as natural buffers**, and incentive schemes **can support household-level adoption** of rain gardens, permeable pavements, or green roofs.

2.6.2 Build Back Better and Integrated Adaptation Frameworks

Context: Enschede's *Adaptation Pyramid* demonstrates a layered approach: first protect through natural systems, then reinforce with engineered measures, and finally prepare for crisis response. The *Re-Start Declaration* (exemplified by Ukraine, Chernihiv[11]) reinforces this logic, showing how climate adaptation, disaster preparedness, and conflict resilience can be integrated into one coordinated framework.

Relevance: Hazards differ (floods, wildfires, pandemics, cyber), but recovery often rebuilds the same vulnerable assets in the same risky places.

Transferable lessons: Recovery investments **should follow Build Back Better logic**[12]; adaptation frameworks **must integrate ecological, technical, and social layers**; and resilience strategies **can be institutionalised through national frameworks** that align climate, health, and security planning.

2.6.3 Dual-Use Infrastructure and Shelter Standards

Context: Lithuania's *Construction Technical Regulation* for shelters and Malta's discussion on modernisation of civil defence shelters highlight how public facilities can serve daily roles and emergency functions. The UK's *Counter-Terrorism through Spatial Planning* strengthens this theme, showing how safety and security can be embedded in building codes and spatial plans from the start, rather than retrofitted later.

Relevance: Across risks (climate heatwaves, geopolitical attacks, pandemics), the same facilities must serve multiple roles.

Transferable lessons: Schools, hospitals, and municipal halls **should be retrofitted as dual-use hubs**; clear technical standards **must govern ventilation, filtration, utilities, and accessibility**; and security considerations **should be integrated into planning frameworks early**, ensuring spaces are both safe and welcoming.

2.6.4 Cross-Border and Cross-Sector Coordination

Context: Flanders' *Cross-Border Flood Agreement* with France and Région SUD's *cross-sector climate governance* shows how agencies can align environment, planning, and security under one framework. The Netherlands' *National Spatial Programme for Defence* extends this logic to defence, balancing security investments with transparent consultation and environmental safeguards.

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[11] The redevelopment concept for Chernihiv titled *"Sustainable redevelopment concept 'Chernihiv – a resilient city'"* outlines a holistic approach combining infrastructure renewal, heritage preservation, and resilience in one integrated strategy. (https://prizes.new-european-bauhaus.europa.eu/application/redevelopment-concept-chernihiv-city?utm_source=chatgpt.com#inline-nav-1)

[12] The United Nations Development Programme (UNDP) & European Union Local Development Forum in Chernihiv Oblast emphasised a "building-back-better" model that integrates security, social cohesion, infrastructure, and environment in recovery.

Relevance: Floods, fires, cyberattacks, and pandemics all require cooperation beyond administrative borders and across sectors.

Transferable lessons: Cross-border agreements **should be formalised for shared hazards**; structured inter-agency platforms **must align environmental, planning, and security actors**; and defence or security expansions **should undergo public consultation and environmental review** to preserve trust.

2.6.5 Data-Driven and Anticipatory Risk Management

Context: Région SUD's data-driven *risk mapping* shows how IoT, GIS, and predictive analytics can trigger early interventions. The *Re-Start Declaration's* integration of hazard mapping and evacuation route planning further illustrates how anticipatory tools can strengthen crisis preparedness, an example of a region that implemented this framework was by Ukraine (Chernihiv)

Relevance: Climate hazards, cyberattacks, and public health threats often develop quickly. Anticipatory monitoring shortens reaction time and reduces losses.

Transferable lessons: Resilience dashboards **should integrate hazard, exposure, and vulnerability data**; predictive tools **can pre-position resources and trigger warnings**; and public-facing maps **should promote transparency and build trust**.

2.6.6 Community Engagement, Equity and Climate Justice

Context: Enschede's *GroenBlauw* programme combines incentives for household adaptation (e.g. rain barrels, green roofs) with vulnerability mapping to prioritise support for disadvantaged groups.

Relevance: Vulnerable groups (elderly, migrants, low-income households) are disproportionately exposed but often least included in planning.

Transferable lessons: Incentive schemes **should make nature-based solutions (NbS) accessible to households and communities**; vulnerability mapping **must guide priority investments**; and participatory processes **can embed equity and local ownership** into resilience strategies.

Across Europe's regions, the **best practices converge on a shared set of lessons**: water management must be systemic and NbS-led, recovery must follow a Build Back Better logic, dual-use infrastructure and shelters must be standard, governance must work across borders and sectors, monitoring must become anticipatory and digital, and communities must be engaged as partners.

Together, these lessons are not isolated pilots but **transferable strategies** that can be scaled and tailored across territorial contexts, ensuring resilience is not only planned but lived in practice.

2.7 Implementation and Monitoring

The best practices illustrate how resilience can be achieved in different contexts. Yet applying these lessons in Flanders, Enschede, Région SUD, Lithuania, and Malta requires clarity on **who does what**, **how measures are delivered**, and **how progress is tracked over time**. Across the five regions, several common patterns emerge that point the way forward.

2.7.1 Actor Roles

Building resilience is not the responsibility of government alone. Each actor plays an important role:

National governments provide the legislative and financial backbone. They set the frameworks through building codes, spatial planning laws, shelter standards, and national adaptation plans.

Regional and local authorities act as frontline implementers, ensuring that wetlands are restored, flood defences maintained, schools and hospitals retrofitted, and community shelters managed. Their proximity to citizens makes them key to equity and trust.

Agencies and utilities (e.g. stormwater units, water corporations, health authorities, energy grid operators) carry out the technical delivery of resilience measures. They also generate and share the monitoring data that underpins resilience dashboards.

Private actors (e.g. construction firms, ICT providers, banks, and insurers) are increasingly critical partners. They not only deliver infrastructure but also co-finance retrofits, provide cyber-resilience solutions, and insure households and businesses.

Civil society and communities (NGOs, schools, volunteer networks, neighbourhood associations) connect resilience strategies to people's everyday lives. They help maintain nature-based solutions, support crisis preparedness, and ensure that vulnerable groups are not left behind.

2.7.2 Implementation Mechanisms

Resilience cannot succeed if implementation remains fragmented. Effective delivery requires:

Coordinating bodies: needed to bring together climate, health, security, and infrastructure actors under one roof. Whether through a national council (Malta), a regional platform (Région SUD), or municipal leadership (Enschede), coordination avoids duplication and speeds response.

Toolkits and guidelines: to translate strategies into practice. Shared templates for dual-use shelter design, NbS maintenance, or equity impact assessments help councils and agencies act consistently.

Public–private partnerships (PPPs): to mobilise both capital and innovation. In Flanders and Enschede, utilities, insurers, and construction firms are reframed as co-investors rather than compliance bodies, ensuring that resilience measures are scalable and financially viable.

Cross-border and inter-regional cooperation is essential, particularly for hazards such as floods, coastal threats, and security risks, which often extend beyond administrative boundaries.

2.7.3 Monitoring and Evaluation

Implementation without monitoring risks being short-lived. Regions converge on the need for:

Resilience dashboards: to integrate hazard, exposure, and vulnerability data across social, ecological, and technological systems. These dashboards connect IoT sensors, GIS mapping, and health surveillance to provide anticipatory triggers for action.

Benchmarks and indicators: to make progress visible. For example, % of schools and hospitals upgraded to dual-use standard, hectares of wetlands restored, litres of rainwater harvested, or reduction in hospital access

gaps for rural populations (Refer to Section 1.4 and the respective regional reports in the Annex for a full list of indicators).

Annual progress reports: required to ensure public transparency and coordinated by central councils or task-forces.

Independent evaluators: to verify outcomes and provide credibility, for example, through audit bodies or universities.

2.7.4 Capacity-Building and Innovation

None of these systems can work without people who know how to use them. Regions consistently emphasised:

Training programmes are needed for councils, utilities, and NGOs on NbS maintenance, shelter management, cyber-preparedness, and crisis communication.

Simulation exercises are needed to test preparedness by bringing health, civil protection, and infrastructure actors together.

Innovation partnerships to pilot AI-driven risk mapping, citizen-science monitoring, and participatory early warning systems are required. These can involve universities, NGOs, and the private sector.

Learning platforms that allow regions to exchange good practices, drawing on programmes such as Horizon Europe (ex. CARDIMED), and Interreg.

3 Conclusions

Europe's regions face converging climate, geopolitical, and public-health pressures that threaten critical infrastructures and communities alike. Floods, heatwaves, droughts, cyber incidents, and pandemics increasingly affect the same schools, hospitals, and transport networks, exposing structural weaknesses in how resilience is governed, financed, and measured.

The VREPO project shows that resilience depends not only on technical solutions but on **governance, coordination, and equity**. Resilient territories require legal frameworks, institutional capacity, and investment choices that link **social, environmental, and technological systems (SETS)**.

Key Messages for Policymakers

- **Resilience must be systemic.** Siloed climate, security, and health policies waste resources; integrated governance multiplies benefits.
- **Preparedness and redundancy reduce long-term costs.** Prevention and backup capacity protect critical services during shocks.
- **Equity ensures effectiveness.** Social inclusion and trust are preconditions for successful crisis response and recovery.
- **Nature and data are resilience assets.** Restored ecosystems and predictive monitoring build both safety and sustainability.

Short-Term Priorities (1–3 years)

Deliver visible progress and institutional readiness.

Strengthen coordination and governance.

- Formalise **resilience taskforces, learning platforms and dashboards** in Enschede, Finland and Lithuania.
- In Malta and Région SUD, establish **single coordinating councils** to align fragmented agencies.

Launch practical no-regret measures.

- Retrofit **schools and hospitals** as dual-use shelters and cooling hubs.
- Expand **urban greening, sponge streets, and flood buffers** in Flanders and Enschede.
- Create **community resilience registries** to identify local volunteers and critical resources.

Enhance monitoring and early warning.

- Integrate **flood, health, and air-quality data** into shared resilience dashboards.

- Partner with **universities and EU innovation hubs** to scale real-time sensing and analytics.

Flanders : Systemic, Proactive Resilience

- **Activate regional Resilience Dashboards** to guide cross-agency action**.**
- **Retrofit hospitals and schools** for dual-use capacity.
- **Embed Build Back Better (BBB) principles in spatial planning** and link to performance-based funding.

Long-Term Priorities (5–10 years)

Move from projects to systemic transformation.

Embed Build Back Better in law and planning

- Make BBB a **legal requirement** for reconstruction and redevelopment.
- Link recovery funding to **resilience benchmarks** and **social-equity outcomes**.

Fortify lifeline corridors and dual-use hubs

- Upgrade **energy, transport, and telecom networks** with redundancy to ensure continuity.
- Modernise **hospitals, schools, and municipal** nodes as resilience anchors.

Institutionalise monitoring and evaluation

- Transform dashboards into **independent Resilience Observatories** with EU-linked indicators.
- Publish annual **territorial resilience reports** to ensure accountability and funding access.

Région Sud: Anticipatory and Health-Integrated Resilience

- Develop **AI-enabled risk management** using Aix-Marseille innovation hubs.
- Align **health, climate, and security** planning under one resilience authority.
- Apply BBB through the **Rebuild–Adapt–Relocate** framework for flood and wildfire recovery.

Lithuania: Security and Redundancy in a Multi-Risk Context

- **Immediate actions: Strengthen coordination between national security, civil protection, and infrastructure agencies to protect critical energy, digital, and transport assets. Retrofit strategic facilities—ports, data centers, hospitals—with redundant power, water, and communication systems.**
- **Next steps: Enact legislation mandating redundancy and cybersecurity standards for lifeline corridors (energy grids, transport, telecoms). Develop cross-border preparedness protocols with neighboring EU states to ensure continuity of supply chains and emergency response. Institutionalise resilience monitoring and auditing as part of national security planning.**

Build Back Better (BBB): From Concept to Action

Build Back Better (BBB) transforms recovery into opportunity. It ensures that reconstruction **reduces vulnerabilities, strengthens systems, and delivers co-benefits** across society, the environment, and the economy.

Core Principles for Policymakers:

1. **Improve, don't restore.** Every recovery project should perform better than before the crisis—stronger, safer, more efficient.
2. **Integrate across SETS.** Combine social (equity, participation), environmental (nature-based buffers), and technological (redundant utilities) dimensions.
3. **Legalise resilience.** Mandate resilience standards in building codes, zoning laws, and fiscal recovery instruments.
4. **Prioritise equity.** Tie recovery funding to **social inclusion** and **just relocation** measures.
5. **Institutionalise learning.** Require post-crisis reviews and data integration into long-term planning.

Practical Measures:

- Retrofit **multi-purpose schools and hospitals** to double as emergency shelters.
- Rehabilitate **wetlands, dunes, and floodplains** as ecological buffers.
- Equip critical nodes with **autonomous power, water, and communication** systems.
- Mandate **public transparency** through digital resilience dashboards and observatories.

Enschede: Innovation-Driven Resilience

- **Build Back Better through elevated and retrofitted infrastructure.**
- **Use IoT and predictive analytics to anticipate heat and flood risks.**
- **Integrate community equity targets into adaptation planning.**

Malta: Resilience in a Small-Island System

- **Centralise resilience governance**
- **Enact multi-hazard shelter standards and modular, dual-use infrastructure.**
- **Establish public–private resilience partnerships and digital dashboards for continuous monitoring**

Table 13 Summary short-term and long-term priorities per territories

Region	Short-Term Priorities (1–3 years)	Long-Term Priorities (5–10 years)
Flanders	- Formalize resilience learning platforms and dashboards- Retrofit schools, hospitals, municipal halls as dual-use hubs- Scale urban greening, sponge streets, flood buffers- Strengthen cross-sector coordination & public–private partnerships	- Embed Build Back Better in planning law- Modernize hospitals and schools as resilience nodes- Institutionalize monitoring and performance reviews- Expand multifunctional resilience hubs
Région SUD	- Clarify roles across fragmented actors; create coordinating councils- Deploy AI-enabled predictive monitoring dashboards- Prioritize cooling shelters and dual-use schools- Activate early-warning protocols	- Apply Build Back Better spatial framework (Rebuild–Renovate/Adapt–Relocate)- Upgrade hospitals, schools, ports, and coastal transport as dual-use and cross-border hubs- Strengthen health-climate-security integration- Restore ecosystems as resilience buffers
Lithuania	- Strengthen institutional coordination- Implement early-warning dashboards integrating hazard and social data- Retrofit critical infrastructure for multi-hazard use- Enhance cross-border collaboration on energy and transport	- Embed resilience in law and spatial planning- Upgrade lifeline corridors with redundancy (energy, transport, communication)- Integrate dual-use, crisis-proof infrastructure- Institutionalize continuous monitoring and evaluation
Enschede	- Retrofit hospitals, schools, and utilities in high-risk districts- Scale wetlands, sponge streets, and nature-based solutions- Deploy City Resilience Dashboard for anticipatory action- Engage communities for equity-driven preparedness	- Expand multifunctional resilience hubs- Integrate equity-focused urban planning- Formalize public–private partnerships for continuous infrastructure upgrading- Maintain adaptive monitoring and scenario planning
Malta	- Centralize national resilience coordination- Clarify roles across government, councils, and private actors- Scale dual-use shelters and schools- Activate early-warning systems and community engagement	- Implement Build Back Better in law and planning- Invest in modular and flexible infrastructure- Maintain integrated monitoring and evaluation systems- Strengthen cross-sector and multi-actor resilience partnerships

Resilience is not only about what regions **build**, but **how they govern and recover**.

The VREPO evidence shows that the path forward is integration—linking climate action, security, health, and planning under a shared vision of **anticipatory, inclusive, and durable resilience**.

By adopting Build Back Better as a binding principle and investing in redundancy, social inclusion, and nature-based systems, Europe's territories can transform fragmented adaptation into **systemic resilience**—one that safeguards citizens, sustains ecosystems, and strengthens democracy.

Annexes

3.1 Policy Instrument Fact Sheets / Profiles

Region	Title	Source
Europe	Policy recommendations for coastal cities to adapt to sea level rise. 4 priorities for cities and territories, 1 call for international action	*Ocean & Climate Platform. (2023, November 9)*
	Extreme rainfall and catastrophic floods in western Europe	*European Centre for Disease Prevention and Control. (2021, July 29)*
	Heatwaves and Health: Guidance on Warning-System Development	*World Health Organization & World Meteorological Organization. (2016, June 30)*
	Mission Cities' Policy Brief Nature-Based Solutions Policy Lab	*NetZeroCities. (2024, June 23)*
	The United Nations World Water Development Report 2024. Water for prosperity and peace	*United Nations, The United Nations World Water Development Report 2024: Water for Prosperity and Peace (2024).*
	Directive 2000/60/EC of the European Parliament and of The Council. Establishing a framework for Community action in the field of water policy	*European Parliament & Council of the European Union. (2000, October 23)*
	Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks	*European Parliament & Council of the European Union. (2007, October 23)*
	Forest Fires – Sparking firesmart policies in the EU	*Rego, F. M. C. C., Moreno Rodríguez, J. M., Vallejo Calzada, V. R., & Xanthopoulos, G. (2018)*
	Reducing wildfire risk in Europe through sustainable forest management	*Held, A., & Pronto, L. (2023)*
	Global Assessment Report on Disaster Risk Reduction. Special Report on Drought 2021	*United Nations Office for Disaster Risk Reduction. (2021)*
	Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change	*European Commission. (2021, February 24)*
	Safer Together - Strengthening Europe's Civilian and Military Preparedness and Readiness (Niinistö report)	*Niinistö, S. (2024, October 30)*

	European Charter on Participatory Democracy in spatial planning processes	*European Council of Spatial Planners (ECTP-CEU) (2016, February)*
	RE-START- EUROPE. ECTP-CEU 2020 declaration for an inclusive and just post-covid future for all communities	*ECTP-CEU. (2020, October)*
	CER Directive	*European Parliament, & Council of the European Union. (2022, December 14)*
	Strategic Foresight Report 2020	*European Commission. (2020, September 9)*
	Territorial Agenda 2030	*Ministers responsible for spatial planning, territorial development and/or territorial cohesion. (2020, December 1). Territorial Agenda 2030: A future for all places.*
	IRC Resilience Dashboard	*https://commission.europa.eu/strategy-and-policy/strategic-foresight/2020-strategic-foresight-report/resilience-dashboards_en*
Lithuania	2023 Country Report - Recommendation on the 2023 National Reform Programme of Lithuania	*European Commission. (2023, June)*
	Lithuania: Capabilities, Organisations, Policies, and Legislation in crisis management and disaster response	*Spassov, P & Tagarev, T. (2015)*
	National energy and climate Action Plan of the Republic of Lithuania for 2021-2030	*Government of the Republic of Lithuania. (2019)*
	Lithuania's Recovery and Resilience Plan	*European Commission. (2024)*
	Summary of the Assessment of the Lithuanian Recovery and Resilience Plan	*European Commission. (2021)*
	Reform Options forLithuanian Climate Neutrality by 2050	*OECD (2023)*
	Guidelines on Member States' adaptation strategies and plans	*European Union (2023)*
	Guidelines for the development of sustainable cities	*Ministry of Environment of the Republic of Lithuania. (2021)*
	Gerosios praktikos kriterijų taikymo gairės (Guidance on the application of the criteria of good practice)	*Sveikatos apsaugos ministerija [Ministry of Health]. (2013)*

Lietuvos Respublikos – Karinė Strategija (Military Strategy of the Republic of Lithuania)	*Ministry of National Defence of the Republic of Lithuania. (2016)*
Nacionalinė Rizikos Analizė (National Risk Analysis)	*Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania. (2021)*
Decision on the adoption of the National Climate Change Governance Agenda	*Seimas of the Republic of Lithuania (2021)*
On the adoption of methodological recommendations for the preparation of emergency plans	*Government of the Republic of Lithuania (2003)*
REPowerEU Plan	*European Commission (2022)*
Republic of Lithuania crisis management and civil protection law	*Seimas of the Republic of Lithuania (2002)*
On the adoption and implementation of the national strategy for sustainable development	*Government of the Republic of Lithuania (2003)*
COVID-19 Valdymo Strategija – „Atsparumas - Atsigavimas – Ateitis“ (COVID-19 Management Strategy – "Resilience - Recovery - Future")	*Government of the Republic of Lithuania. (2020)*
Decision on the adoption of the national climate change governance agenda	*Seimas of the Republic of Lithuania (2021)*
Nacionalinio Visuomenės Sveikatos Centro Prie Sveikatos Apsaugos Ministerijos 2023–2025 M. Ekstremaliųjų Situacijų Prevencijos Priemonių Planas (Plan of emergency prevention measures 2023-2025)	*National Public Health Centre under the Ministry of Health (2022)*
Requirements for the design and installation of a hiding place, a collective protection structure and a shelter	*Minister of the Environment of the Republic of Lithuania(2024)*
Ekonomikos gaivinimo ir atsparumo didinimo planas – „naujos kartos lietuva“ (Recovery and resilience plan – "next generation lithuania")	*Government of the Republic of Lithuania. (2021)*
Lithuania’s vision for the future - ‘Lithuania 2050’	*Government of the Republic of Lithuania (2023)*
Koks Tavo vaidmuo valstybės gynyboje? (What is your role in the defense of the state?) (website)	*https://kam.lt/valstybes-instituciju-ir-pilieciu-pasirengimas-gynybai/*
Decision on the adoption of the national security strategy	*Seimas of the Republic of Lithuania (2002)*
Law on the fundamentals of national security of the Republic of Lithuania	*Government of the Republic of Lithuania. (1996)*

	Krizių valdymas mokyklose – Metodinė medžiaga mokyklų krizių valdymo komandoms (Crisis management in schools – Methodological material for school crisis management teams)	*Polukordienė, K. O., Skruibis, P., Bagdonienė, M., Rekuč, V., & Skruibienė, I. (2010)*
	The Adaptation Principles: 6 Ways to Build Resilience to Climate Change (website)	*https://www.worldbank.org/en/news/feature/2020/11/17/the-adaptation-principles-6-ways-to-build-resilience-to-climate-change*
	Economic policy coordination in 2021: overcoming COVID-19, supporting the recovery and modernising our economy	*European Commission (2021)*
	Law on the Protection of Movable Cultural Property	*Government of the Republic of Lithuania. (1996)*
	Resolution on the future of Lithuania's Demographic Policy	*Seimas of the Republic of Lithuania (2023)*
	Law on the Protection of Immovable Cultural Heritage	*Government of the Republic of Lithuania. (1994)*
Malta	Malta's Sustainable Development Vision for 2050	*Government of Malta. (2018)*
	Malta's National Recovery and Resilience Plan - Latest state of play	*European Commission. (2022)*
	Council recommendation on the economic, social, employment, structural and budgetary policies of Malta	*European Commission (2024)*
	First Flood Risk Management Plans - Member State: Malta	*European Commission (2019)*
	2nd Flood Risk Management Plan for the Malta River Basin District	*The Energy and Water Agency, Malta (2021)*
	At a glance: Malta's CAP Strategic Plan	*European Commission. (2022)*
	Building Resilience Transforming Services – A Mental Health Strategy for Malta 2020-2030	*Ministry for Health, Malta (n.d.)*
	Malta's Strategy for Resilient Food Systems. Building Sustainability, Together	*Government of Malta. (2024)*
	SPED - Stategic Plan for Environment and Development	*Government of Malta. (2015)*
	Climate Action Act	*Government of Malta. (2015)*

	National Energy and Climate Plan 2021-2030	*Government of Malta. (2023)*
Region SUD	Plan Climat Air Energie Territorial 2019-2025 – Bilan et stratégie	*Métropole Nice Côte d'Azur (2019)*
	Annexe 1 – Orientations stratégiques régionales pour la transition écologique de la mobilité en région Provence – Alpes – Côte d'Azur	-
	Dispositif "Guerre du Feu" – Prévenir le risque, Combattre le feu, Reconstruire	*Région Provence-Alpes-Côte d'Azur (n.d.)*
	Synthèse des enjeux liés au changement climatique en région Provence-Alpes-Côte d'Azur	*Région Provence-Alpes-Côte d'Azur (n.d.)*
	Livre blanc des risques naturels majeurs en région Provence-Alpes-Côte d'Azur	*Région Provence-Alpes-Côte d'Azur (2020)*
	Cadrage pour la réalisation d'un diagnostic de vulnérabilité des infrastructures de transport d'intérêt national et régional face au changement climatique et pour l'élaboration d'un plan stratégique de résilience multipartenarial	*Région Provence-Alpes-Côte d'Azur (2023)*
	Gardons une cop d'avance – Le Plan climat de la Région Provence-Alpes-Côte d'Azur	*Région Provence-Alpes-Côte d'Azur (n.d.)*
	Des risques anticipes face au changement climatique: strategie regionale pour un territoire resilient aux risques naturels majeurs	-
Flanders	Belgian National Adaptation Plan	*National Climate Commission (2016)*
	Belgium's National Recovery and Resilience Plan - Latest state of play	*Hallak, I. et al. (2024, March)*
	First Flood Risk Management Plans – Member State: Belgium	*European Commision (2019)*
	River Basin Management Plan Scheldt and Meuse 2022-2027	*Coördinatiecomissie Integraal Waterbeleid (n.d.)*
	The Blue Deal: Tackling drought and water scarcity in Flanders, Belgium. A forward-looking approach to systemic change	*European Union (2024)*
	Risks In Belgium (website)	*https://crisis-center.be/en/risks-belgium*
	Green Infrastructure (website)	*https://biodiversity.europa.eu/countries/belgium/green-infrastructure*
	Strategisch Plan Dendervallei – v 3.0 definitieve versie strategisch plan ruimte voor water	*IMDC (2024)*
	Sigmaplan bouwt aan een overstromings-veilig Vlaanderen (website)	*https://www.sigmaplan.be/nl*

	Kustvisie (website)	https://www.vlaanderen.be/kustvisie
	Weerbare Westhoek	*Taskforce Weerbare Westhoek (2023)*
	Blue Deal (website)	https://www.integraalwater-beleid.be/nl/bluedeal
	Spatial Policy Plan for Flanders	*Flemisch Government (n.d.)*
	Flemish Climate Policy Plan 2013-2020	*Flemish Government (2013)*
Enschede	Crisisplan 2022–2025	*Waterschap Vechtstromen (2021)*
	Landelijk Crisisplan – Hoogwater en Overstromingen	*Ministerie Infrastructuur en Waterstaat (2020)*
	Water- en Klimaatadaptatieplan Gemeente Enschede 2022-2026. Verder bouwen aan een groen-blauw Enschede	*Municipality of Enschede (2016)*
	Gezond Enschede. Beleidskader Gezondheid & Vitaliteit 2024	*Municipality of Enschede (2024)*
	ThemaplanKlimaat	*Waterschap Vechtstromen (2022)*
	Nationaal Deltaprogramma (website)	https://www.deltaprogramma.nl/
	Waterbeheerprogramma 2022-2027 Vechtstromen	*Waterschap Vechtstromen (n.d.)*
	Groenambitieplan Enschede 2050	*Municipality of Enschede (n.d.)*

3.2 Multi-Criteria Analysis

Category	Criteria	Description
ToR-criteria	Spatiality	*Does the strategy address a spatial measure?*
	Operationality	*Is the strategy comprehensible and suitable for implementation?*
	Resilience potential	*Does the strategy hold potential for enhancing territorial resilience, while delivering equal benefits for all populations groups?*

WS 3.1		Innovation potential	*Does the strategy offer possibilities for technological innovation?*
DMC criteria	Mitigation	Hazard and vulnerability assessment	*How relevant is the strategy for supporting the assessment of hazards and vulnerabilities in the region?*
		Mitigation	*How relevant is the strategy for reducing risks and mitigating potential impacts before a disaster occurs?*
		Contingency planning for next disasters	*How relevant is the strategy for informing contingency planning aimed at future disasters?*
	Preparedness	Contingency planning	*How relevant is the strategy for developing pre-crisis contingency plans?*
		Warning	*How relevant is the strategy for establishing or improving early-warning systems?*
		Evacuation	*How relevant is the strategy for facilitating effective evacuation measures during a crisis?*
	Response	Disaster response and rescue	*How relevant is the strategy for enabling rapid response and rescue operations during or immediately after a disaster?*
		Saving lives	*How relevant is the strategy for directly preventing loss of life during disaster events?*
		Minimizing immediate impacts	*How relevant is the strategy for reducing immediate physical, social, or economic impacts following a disaster?*
	Recovery	Rehabilitating basic services and functions	*How relevant is the strategy for restoring essential services (e.g., water, energy, transport) and critical functions in the aftermath of a disaster?*
		Reconstruction to full recovery	*How relevant is the strategy for supporting long-term reconstruction and return to pre-disaster conditions (or better)?*
		Prevention of next disasters	*How relevant is the strategy for preventing recurrence or reducing vulnerability to similar disasters in the future?*

3.3 List of intermediate deliverables

ID1 – TA Regional Focus (January 2025)

- One report per stakeholder territory (5 in total) and one communality report.
- Format: Word document with annexes.

ID2 – Data Report (May 16, 2025)

- Compilation of data research, identified gaps, methodologies, and strategies.
- Includes spatial datasets on territorial resilience indicators.
- Format: Word document with annexes.

ID3 – List of Operational Strategies (May 16, 2025)

- Structured list of strategies to enhance territorial resilience.
- Categorized by document type, scope, and policy issues.
- Format: Excel file.

ID4 – Policy Recommendations Report (August 2025)

- Finalized set of policy recommendations- One report per stakeholder territory (5 in total)
- Covers general and context-specific strategies, implementation guidelines, and monitoring frameworks.
- Format: Word document with annexes.

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The ESPON EGTC is the Single Beneficiary of the ESPON 2030 Cooperation Programme. The Single Operation within the programme is implemented by the ESPON EGTC and co-financed by the European Regional Development Fund, the EU Member States and the Partner States, Iceland, Liechtenstein, Norway, and Switzerland.