ESPON

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FINAL DELIVERABLE

Regional Report - Malta

VREPO

Final Report // November 2025

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1 Executive Summary

Malta's resilience landscape is defined by its **small size, high density, and central Mediterranean location**, which make it simultaneously vulnerable to **climate hazards (floods, heat, droughts, storms, coastal erosion)**, **geopolitical disruptions (cyberattacks, supply chain shocks, civil defence challenges)**, and **public health crises (pandemics, Chemical, Biological, Radioactive, Nuclear, and Explosive (CBRNe) threats)**. The nine recommendation tables developed for Malta highlight the need for **integrated governance, multifunctional infrastructure, robust surveillance, and equity-driven planning**.

This report provides a **comprehensive framework for resilience** that combines evidence tables, cross-risk synthesis, and transferable best practices. The evidence tables present operational recommendations across the **Social-Ecological-Technological-System (SETS)** and the four stages of the **Disaster Management Cycle (DMC)**. Across risks, the same infrastructures — **hospitals, schools, utilities, transport corridors, and shelters**, face recurring pressures, underscoring the importance of **dual-use design** and **cross-sector coordination**. Resilience in Malta therefore requires:

1. **Integrated national coordination** under the Office of the Prime Minister to overcome fragmented responsibilities.
2. **Dual-use, multi-hazard infrastructure** that maximises limited space and resources, enabling schools, halls, and health centres to function as resilience hubs.
3. **Multi-actor partnerships** that embed private utilities, NGOs, local councils, and regional councils (e.g. the Southern Regional Council) into ongoing maintenance, surveillance, and recovery.

A unifying recommendation across risks is the adoption of **Build Back Better as a spatial planning framework for recovery.** Unlike building codes that focus only on technical standards, this framework guides *where and how* to (not) rebuild, ensuring equity, relocation clarity, and long-term resilience. The spatial planning framework ensures that:

- **low-risk areas** host resilient new developments,
- **moderate-risk areas** allow renovation only with mandatory adaptation measures, and
- **high-risk areas** trigger relocation supported by land reallocation and compensation instruments.

International **best practices** demonstrate how these priorities can be implemented in practice and adapted to Maltese conditions. Making Malta more **resilient** means treating every investment as multi-purpose, every institution as part of a coordinated system, and every crisis as a chance to build back better. By **uniting government, private utilities, and communities in a proactive resilience partnership**, Malta can transform its small size from a vulnerability into an advantage — enabling agile, integrated, and future-proof resilience across all risks.

2 Introduction

The work presented in this document is part of an ESPON Targeted Analysis (TA) entitled "Vulnerability, Resilience and Recovery Policies of the Physical Living Environment (VREPO)" which aims to strengthen integrated territorial development by building local and regional capacity for resilience and recovery policymaking. It focuses on analysing current policies, governance practices, and implementation challenges across diverse European regions and climatic zones. Through policy research and continued stakeholder engagement, VREPO investigates pre- and post-crisis resilience strategies, identifies vulnerabilities in the physical living environment and develops targeted policy recommendations for the 5 regions forming part of this TA: Flanders Region (Belgium), Région SUD Provence-Alpes-Côte d'Azur (France), Lithuania, the municipality of Enschede (Netherlands), and the Southern Regional Council of Malta (Malta).

To achieve the aims of this TA we conducted four main tasks together with two hybrid workshops (in Vilnius and Brussels) where stakeholders participated in regional-specific exercises and provided input and/or feedback on the respective tasks.

- **Task 1** – Development of a conceptual framework and identification of priority risks composed of: hazards, exposures, and vulnerabilities, within each region.
- **Task 2** – Analysis of data availability, selection of Territorial Resilience Indicators, data collection and harmonization for indicator development.
- **Task 3** – Scrutiny of territorial resilience strategies and assessment of their application potential to each stakeholder region.
- **Task 4** – Development of practical, place-based recommendations on resilience strategies, instruments, governance, actions, and good practices for each region, as well as resilience strategies common to all regions forming part of this TA.

Within Task 1, a conceptual framework for territorial resilience was developed with resilience conceptualized as the capacity of coupled Social–Ecological–Technological-Systems (SETS) to mitigate risks, prepare for and respond to hazards, and recover from their impacts, while simultaneously adapting and transforming to confront future, unforeseen challenges.

- **Social**: Communities and populations exposed in rural and urban environments, including factors such as demographics, public health, economic conditions, and governance capacity.
- **Ecological**: The natural environment, ecosystems, and biodiversity, which provide critical services for human and planetary health but are increasingly under stress from climate impacts.
- **Technological**: Public amenities (e.g., hospitals, schools, care facilities) and critical infrastructure (e.g., energy, water, transport, telecommunications) that are located in hazard-prone areas and are essential for societal resilience.

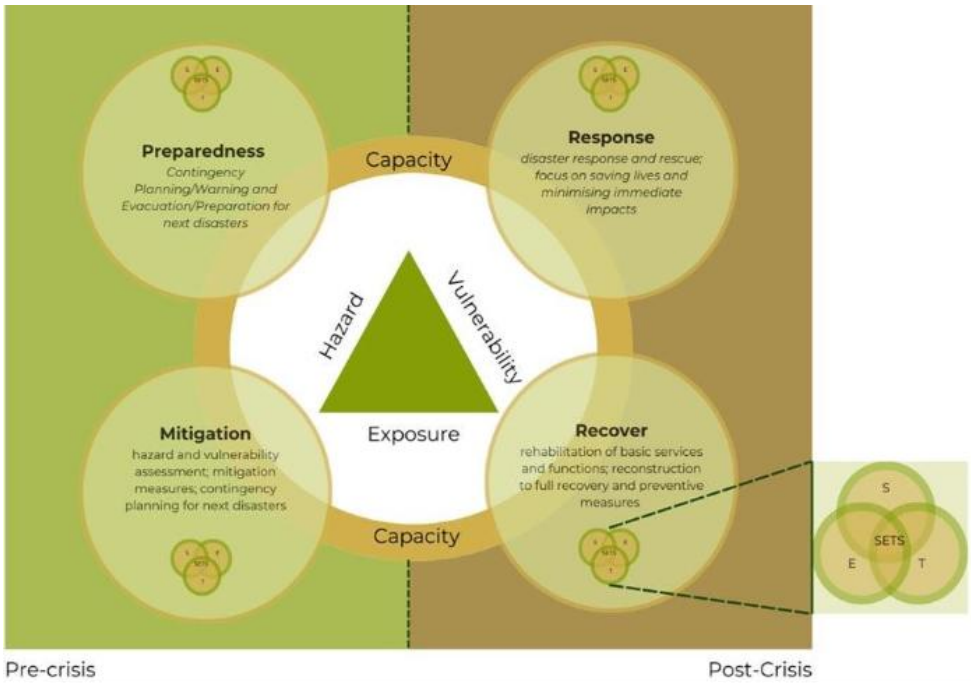


Figure 1 - The conceptual framework

By integrating the principles of the SETS framework, this approach establishes explicit linkages between hazards, vulnerabilities, and exposures, and the capacity of regions to act across the four stages of the Disaster Management Cycle (DMC) - mitigation, preparedness, response, and recovery.

- **Mitigation**: Actions to reduce or minimize risks and adverse impacts of hazards. Examples include hazard assessments, early warning systems, strengthening infrastructure, restoring wetlands, promoting sustainable land use practices, improved environmental and social policies and retrofitting buildings.
- **Preparedness**: The planning and implementation of measures to ensure readiness for hazards. 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 minimize 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 hazards. 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).

The territorial resilience recommendations presented in this document are framed using the conceptual framework described above resulting in a set of SETS-based actions for each stage of the DMC for three main risk categories in line with Malta's specific needs and priorities as described in Section 3.

3 Territorial Risk Profile

This section provides an overview of the key priority risks identified for Malta, where **Risk** is defined 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).*

This relationship is often expressed as:

Risk = Hazard x Exposure x Vulnerability

The risk landscape of Malta (Figure 2) is characterised by three overarching categories: climate risks, geopolitical risks, and public health risks, each associated with distinct hazards, exposures, and vulnerabilities. We note that while the conceptual framework is needed to systematically assess SETS vulnerabilities and exposures across all three risk categories, overlaps are common. For example, a single hazard may simultaneously disrupt ecological systems, impact communities, and damage critical infrastructure.

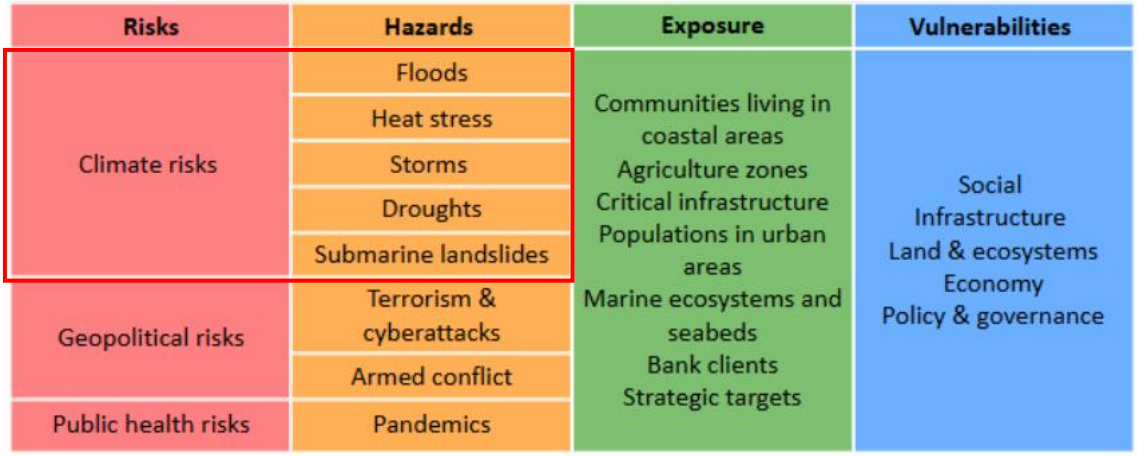


Figure 2 - The priority areas of Malta, including the main risk categories, alongside their hazards, exposures, and associated vulnerabilities.

Climate-related risks are considered the topmost priority for Malta, reflecting both the region's geographical characteristics and its socio-economic dependencies. Hazards such as floods, heat stress, storms, droughts, and submarine landslides pose recurring and intensifying threats to communities living in coastal & urban areas, agricultural zones, marine ecosystems, and critical infrastructure. Given region's dense urban fabric, the close proximity of settlements to coastal zones, and the country's heavy reliance on limited and highly productive agricultural land, climate-related hazards carry disproportionate impacts across multiple domains of vulnerability, including infrastructure, ecosystems, social well-being, and economic stability.

Geopolitical risks, while less frequent, carry high-impact potential, particularly in the context of armed conflict and hybrid threats. Strategic targets, bank clients, and critical infrastructure are most exposed in this category, and their

disruption could lead to cascading effects across governance, economic stability, and social cohesion. Though not as immediate as climate risks, their potential consequences position them as the second-most pressing category of concern.

Public health risks are represented in the framework by pandemics which are characterised by their potentially severe consequences for urban populations, healthcare systems, and economic activities. The COVID-19 pandemic demonstrated how quickly such crises can overwhelm health infrastructure and disrupt societal functioning. In Malta, vulnerabilities in healthcare capacity, critical infrastructure, and social systems make preparedness a priority, even if these risks are ranked below climate and geopolitical concerns.

4 Risk Maps

This project collected a set of **spatial indicators** describing priority hazards, critical infrastructures, and ecological and social vulnerabilities relevant to Malta. Hazards that cannot be mapped spatially, such as cyber threats, were excluded. All indicators were harmonized on a hexagonal grid to enable the analysis of spatial co-occurrence of hazards, exposure, and vulnerabilities across the Maltese islands. The complete list of indicators is provided in Table 1, with details on data sources, processing, and data gaps available in the Data Report[1].

The maps in the following section illustrate examples of how these indicators can be combined to assess regional risk patterns across Malta. The aim is not to present every possible combination but to demonstrate how local authorities can use the dataset to produce risk maps tailored to specific planning and risk management needs. An atlas of maps is provided in the annexes.

The dataset integrates the spatial indicators organized into the following categories (Table 1):

- **Hazard** – including fluvial flood risk as the primary mapped hazard.
- **Critical and Social Infrastructure** – including population, buildings, schools, hospitals, wastewater treatment plants, and energy infrastructure.
- **Environmental and Social Vulnerability** – including land cover, natural areas, biodiversity, demographic characteristics, and rural–urban classification.

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.

Together, these indicators allow for **multi-dimensional analysis of exposure, hazards, and vulnerability patterns at a regional level including Malta**. The dataset, available on the ESPON portal, includes accompanying metadata describing definitions, sources, and data processing steps.

[1] **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

Table 1 Overview of spatial indicators collected

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.

With these metrics, the following maps and graphs can be created. Other combinations between the metrics are possible after further data analysis. For example, each statistic can be broken down into the different NUTS regions to assess which sub-region is most at risk for a given hazard, exposure and/or vulnerability.

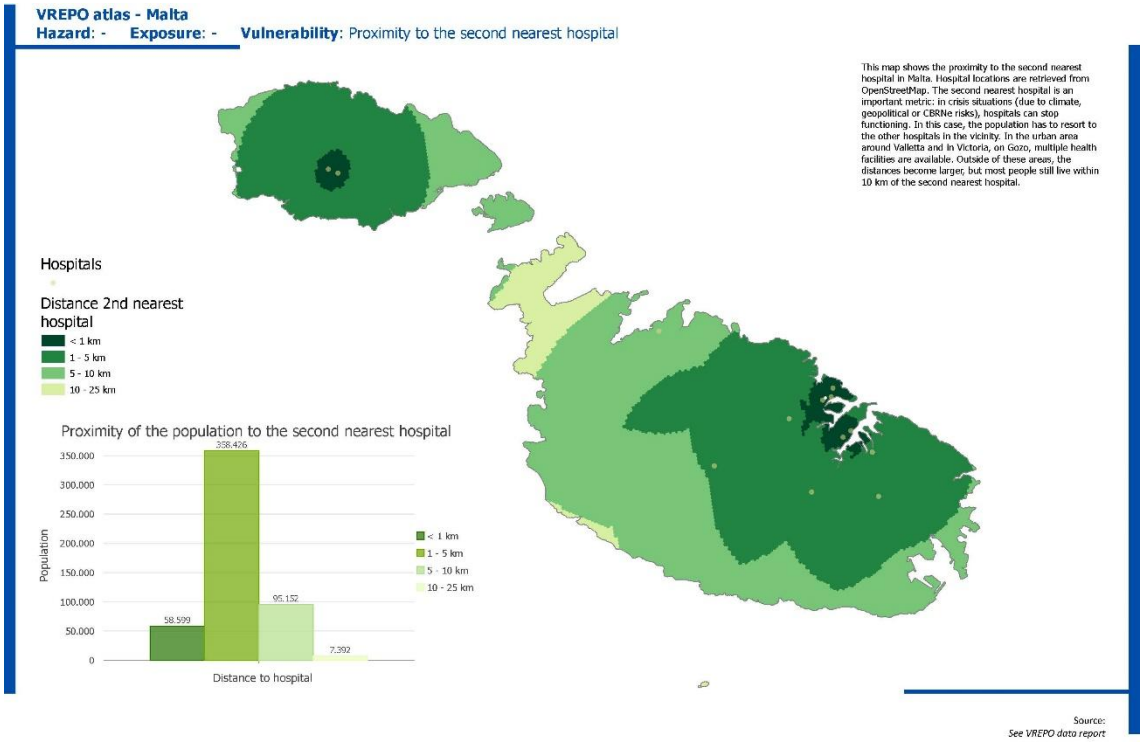


Figure 3 - Proximity to the Second Nearest Hospital in Malta

Indicators: Hospital locations, population distribution proximity to the Second Nearest Hospital

This map evaluates the redundancy and resilience of Malta's healthcare network by measuring how close the population is to the **second nearest hospital**. Given the island's relatively small size, most residents are already close to at least one hospital, making proximity to the first hospital less informative. Assessing the second nearest facility, however, provides meaningful insight into **alternative healthcare options** in cases where the nearest hospital is unavailable due to climate events, geopolitical disruptions, or CBRNe incidents.

Rather than a standalone indicator, the map is a composite analytical product integrating hospital location data (OpenStreetMap), population distribution, and spatial proximity analysis. It highlights areas where access to secondary healthcare facilities may be limited, providing insight into the resilience of medical service coverage across the country.

The results show that urban areas around Valletta and Victoria (Gozo) benefit from multiple healthcare facilities, ensuring rapid access and strong redundancy. In contrast, rural and peripheral regions face longer distances to

alternative hospitals, indicating potential gaps in emergency accessibility. Nevertheless, most of Malta's population lives within 10 km of a second hospital, reflecting generally good national coverage.

Policy Takeaways:

- **Strengthen healthcare redundancy** by factoring access to the second nearest hospital into crisis planning.
- **Prioritize investment in rural and peripheral areas** with limited access to alternative hospitals.
- **Integrate redundancy mapping into national emergency** preparedness and climate adaptation strategies.
- **Enhance healthcare system capacity and connectivity** to ensure continuity of services during disruptions.
- **Promote equitable healthcare access** by addressing spatial disparities across Malta.

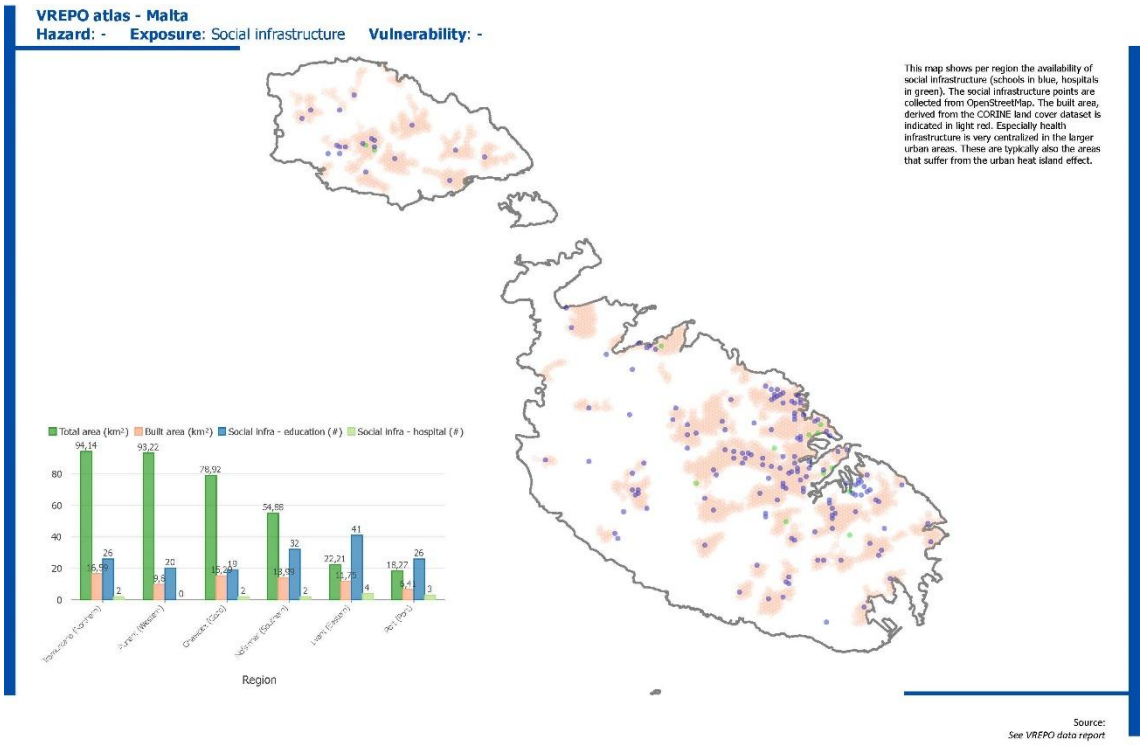


Figure 4 Map of Social Infrastructure in Malta

Indicators: Social infrastructure points; Built-up areas; Urban heat island effect

Figure 4 provides a **spatial overview of social infrastructure in Malta**, highlighting the distribution of **schools (blue) and hospitals (green)** in relation to **built-up areas (light red)**. The map combines data from **OpenStreetMap** on social infrastructure points with the **CORINE land cover dataset** for built areas, while also considering the **urban heat island effect**. This **composite analytical product** should not be regarded as a single indicator but as a **synthesis of multiple spatial datasets** to support **policy planning and decision-making**.

The map shows that **health infrastructure is highly centralized in Malta's larger urban areas**, which also coincide with regions experiencing the **urban heat island effect**. **Schools**, though somewhat more dispersed, still show **clustering around urban centers**. These patterns reveal **disparities in access to essential services**, with **rural and less densely populated regions** facing lower accessibility to health facilities. The findings highlight the need to consider both **service coverage** and **environmental vulnerabilities**, particularly **heat-related risks**, when planning **new social infrastructure**.

Policy Takeaways:

- **Decentralize health services** to improve access in less urbanized regions.
- **Integrate urban heat mitigation strategies** when planning future health infrastructure in high-density urban areas.
- **Strategically locate new schools and hospitals** to balance accessibility across all regions.
- **Use composite spatial indicators** in planning to better capture multi-dimensional challenges rather than relying on single indicators.

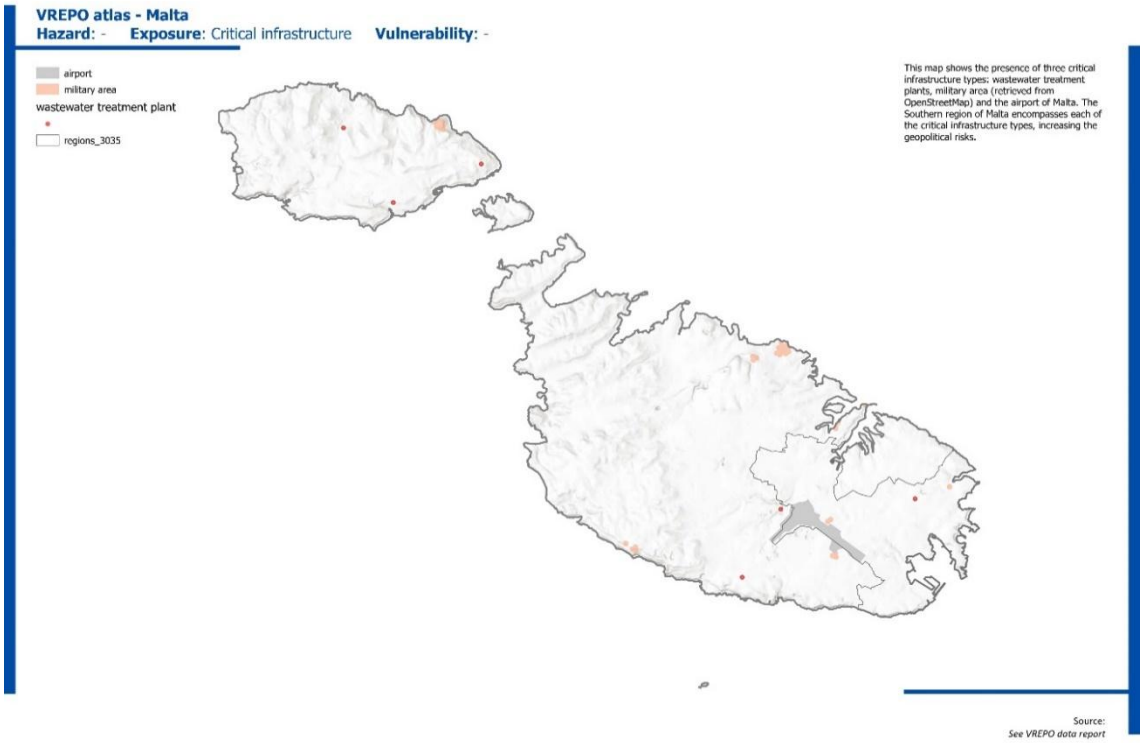


Figure 5 Map of Critical Infrastructure in Malta

Indicators: critical infrastructures

Figure 5 provides a **spatial overview of critical infrastructure in Malta**, highlighting the location of **wastewater treatment plants**, **military areas**, and the **Malta airport**. The map integrates data from **OpenStreetMap** for critical infrastructure points to analyze **regional distribution and associated geopolitical risks**. This map should be regarded not as a single indicator, but as a **composite analytical product** derived from multiple spatial datasets to inform **risk management and policy planning**.

The map shows that the **Southern region of Malta contains all three critical infrastructure types**, including **wastewater treatment plants**, **military zones**, and the **airport**. This concentration highlights an **elevated level of geopolitical risk** for the southern region compared to other parts of the island. The spatial clustering of these infrastructure types indicates the need for **strategic planning, risk mitigation, and emergency preparedness** in areas with overlapping critical assets.

Policy Takeaways:

- **Prioritize risk management and emergency planning** in the southern region due to the concentration of critical infrastructure.
- **Consider decentralization or redundancy** for key infrastructure to reduce vulnerability to potential threats.

- **Integrate geopolitical risk assessment** into future infrastructure development and urban planning.
- **Use composite spatial indicators** to identify high-risk areas where multiple critical assets overlap.

5 Identified Gaps in Resilience

The identification of priority risks in Task 1 and indicator development in Task 2 were complemented in Task 3 by a systematic review of existing territorial resilience strategies, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol. Relevant policy documents from European and regional sources from the five territories were collected, screened, and validated with stakeholders, resulting in 92 key documents. From these, 329 strategies were extracted, categorized by DMC stage, hazard domain, governance level, and spatial scale, then refined through deduplication and pre-assessment to 97 unique strategies. These were further evaluated through a multi-criteria assessment (MCA) based on spatiality, operationality, innovation, resilience potential, and stakeholder-defined priorities. The process, consolidated in Workshop 3.2, produced a final ranked set of 40 operational strategies (29 stemming from existing strategies, and 11 new strategies addressing gaps identified by stakeholders), mapped to risks and DMC stages, which highlight strong coverage of pre-crisis preparedness and mitigation but reveal notable persistent gaps in recovery-oriented policies.

The list of existing strategies (a total of 29 strategies) consists mostly of climate strategies with fewer geopolitical and public health strategies. Climate risks are the most represented category, with 18 strategies identified across three out of four stages of the DMC cycle. However, none of the identified 18 strategies address the recovery stage, a shortfall that is consistent across all three risk categories. By comparison, geopolitical and public health risks are less represented, with 5 and 6 strategies each, respectively. Geopolitical strategies tend to focus less on mitigation strategies altogether and lack recovery-stage strategies. Existing strategies consist of 1, 2 and 3 Public Health strategies for Mitigation, Preparedness and Response, respectively but, similarly to the other risk categories, have no recovery-stage strategies. Across all three risk categories, there are no existing recovery strategies, and no mitigation strategies for geopolitical risks.

From the 29 existing strategies identified across the five stakeholder regions, a subset was selected as particularly relevant for Malta. This selection was guided by a combination of factors: the specific priority risks from Task 1 and stakeholder input on local needs, and the territorial context of Malta.

Based on these criteria, 19 strategies were identified as relevant for Malta (stemming from existing strategies), distributed across risk categories and DMC stages as follows:

- 11 strategies under Climate (6 Mitigation, 4 Preparedness, 1 Response and 0 Recovery)
- 3 strategies within Geopolitical (0 Mitigation, 2 Preparedness, 1 Response and 0 Recovery)
- 5 strategies falling under Public Health (1 Mitigation, 1 Preparedness, 3 Response and 0 Recovery)

Figure 6 illustrates the distribution of the **existing strategies** for Malta across the four stages of the DMC and the primary risk categories. Grey cells indicate stages for which no existing strategies are present, highlighting gaps in the current proposal set. This visualization is intended to identify gaps rather than assess the performance of existing policy implementation. Based on these identified gaps, we developed targeted policy recommendations to strengthen the alignment of disaster management strategies with the DMC and the associated SETS for each risk category (Section 6). These recommendations aim to foster a comprehensive and balanced disaster management approach, ensuring that all DMC stages are adequately addressed and that existing policy gaps are effectively filled.

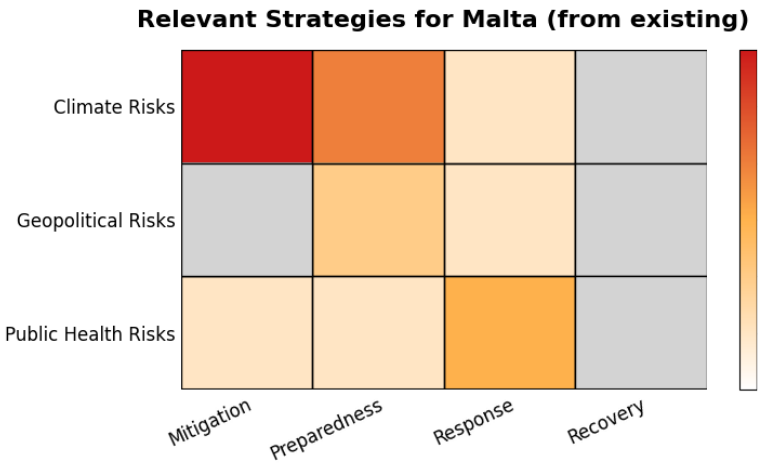


Figure 6 - Heatmap showing the distribution of existing strategies across DMC stages and risk categories in Malta. The darker red gradient denotes a greater number of existing strategies. Grey cells indicate that no existing strategies are present.

We then developed targeted policy recommendations to address these identified gaps and strengthen the alignment of disaster management strategies in Malta with the DMC and the associated SETS for each risk category. These recommendations aim to support the development of a comprehensive and balanced disaster management approach, ensuring that all stages of the DMC are adequately covered and existing policy gaps are effectively closed.

6 Policy Recommendations

The risk maps in Section 4 illustrate where and how Malta is 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 5. Building on this evidence, the following nine evidence tables (one for each risk category and SETS dimension combination) provide the analytical foundation for this report. They map risks across climate, geopolitical, and public health hazards, breaking them down by the social, ecological, and technological dimensions and across the four stages of the Disaster Management Cycle (DMC). Together, they provide targeted actions for each risk category while also laying the groundwork for cross-sectoral and public–private collaboration. The relevant existing strategies identified in Section 5, with the addition of recommendations to address the associated gaps across the DMC stages and SETS dimensions, all of which are within the recommendation tables below.

For each of the three risk categories and SETS dimensions (3x3) we present territorial policy recommendations across the DMC stages (Table 2). 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 2 – 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.

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 Maltese context. The tables were developed through a multi-step, evidence-based process to ensure their relevance and practicality for Malta. Starting with Task 3 recommendations as a foundation, the strategies were refined through feedback gathered from focus groups and workshops involving local

stakeholders, experts, and policymakers. Additionally, further research into current instruments, governance frameworks, and policies in Malta helped identify gaps and areas where implementation is lacking. Thus, the recommendations presented include both recommendations which stem from existing strategies, and which require improvements as well as recommendations addressing gaps in policy in-line with the risks identified in this TA.

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: Stakeholders had limited opportunity to provide feedback on the final recommendations presented in the tables below, which are largely based on desk-based work by the consortium. Moreover, as this study was conducted externally and without sustained on-the-ground expertise across sectors, certain local nuances, socio-political dynamics, and emerging issues may not be fully captured. The guidance provided here should therefore be regarded as a preliminary framework that requires supplementation through local expertise, validation, and continuous stakeholder engagement to ensure its relevance, effectiveness, and sensitivity to the local context.

Climate Risks – Social Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- **Rehabilitate and expand urban drainage** with **sustainable drainage systems (SuDS)** and **natural retention** to maximise rainwater harvesting, reducing reliance on desalination.- **Depave impermeable surfaces** and integrate **cisterns in all new builds/retrofits**, reviving Malta's traditional water-harvesting practice.- Expand **green and blue infrastructure** (green roofs, climbers, vertical greening, PV pergolas, tree corridors) to mitigate the **Urban Heat Island effect (Figure 4)**, especially in the east.- Protect **cultural heritage** from floods and heat by applying adaptive conservation techniques for limestone and historic cores.- Conduct **climate cost-benefit analyses** that include **non-market values** such as heritage, health, and tourism.	- **Amend planning laws** to embed **Climate Resilience Impact Assessments (CRIAs)** into all development approvals.- **Update zoning maps** with hazard layers (flood, heat, coastal erosion) and align with adaptation needs, including higher-elevation areas.- **Mandate cisterns, insulation, permeable paving, shading, and green roofs** in building regulations (new builds + retrofits).- Provide **grants, subsidies, and tax incentives** for retrofitting rainwater harvesting, insulation, and cooling solutions.- Use **thermal imaging assessments** to prioritise heat interventions.- Run **national awareness campaigns** (Maltese + English) on water reuse, urban greening, and energy efficiency.	- **Stormwater Unit (PWD)** leads drainage upgrades; **Water Services Corporation (WSC)** integrates with water network.- **Transport and Infrastructure Ministry** oversees alignment with road and construction works.- **Planning Authority** enforces CRIAs and zoning, coordinated with **Superintendence of Cultural Heritage** for heritage protection.- **National Flood Relief Project (NFRP)** provides data to guide investments.- A **central GIS monitoring platform** ensures real-time coordination across ministries, utilities, and local councils.
Preparedness *(ensure readiness before hazards occur)*	- Develop **inclusive evacuation strategies** with pre-identified routes, multi-modal transport (buses, vans, ferries), and **accessible safe zones**.- Establish a **National Cooling Shelter Strategy**, moving beyond ad hoc approaches to ensure **mandatory, climate-ready shelters** near vulnerable populations (Figure 4).- Set up **wellness check systems** for heat and drought risks using **parish/local council networks** to reach elderly, migrants, and low-income households.- Ensure **telecom resilience** with redundancy to avoid breakdowns in crisis communication.	- Legally embed **evacuation and shelter protocols** into Malta's **Civil Protection Framework**.- Create a **national registry of cooling shelters and evacuation centres** linked to hazard maps.- Require **telecom providers** to build redundancy and backup into systems.- Train **EU-supported volunteer networks** (local councils, parishes, NGOs) for first-response duties.- Conduct **annual drills and simulations** with communities, schools, and local organisations.- Disseminate **trusted communication guidelines** for evacuation and heat risk in Maltese and English.	- **Civil Protection Department** coordinates national evacuation and shelter strategies.- **Health Ministry** leads wellness checks and medical readiness.- **Local councils and parishes** mobilise volunteers and identify vulnerable residents.- **Telecom operators** maintain communication resilience.- A **National Flood & Infrastructure Coordination Forum** brings together ministries, WSC, contractors, and councils for quarterly preparedness planning.
Response *(immediate actions during/after hazards)*	- Activate a **territorial crisis management system** during floods, storms, or heatwaves to mobilise emergency services, conduct rapid assessments, and restore critical services.- Ensure **continuity of port and airport operations** as lifelines for Malta's supply chain.- Deploy **mobile logistics hubs** for food, water, and medicine to isolated communities.- Operate **public cooling shelters with backup power** to safeguard vulnerable groups.- Deliver **real-time crisis communication** (hotlines, SMS, social media) in Maltese/English.	- Establish **standardised emergency protocols** in Civil Protection legislation.- **Pre-position logistics hubs** close to ports and airports.- Sign **formal agreements with NGOs, parishes, and community groups** for shelter operations and relief services.- Invest in **backup energy and microgrids** for cooling shelters and health centres.- Run **joint training exercises** simulating port, airport, and telecom disruptions.	- **Civil Protection Department** leads emergency activation.- **Transport Malta** ensures port/airport resilience.- **Health Ministry** provides medical and wellness response.- **Local councils and NGOs** (Red Cross, Caritas, band clubs, parishes) run shelters and outreach.- A **multi-agency command platform** links ministries, utilities, Civil Protection, and councils for real-time coordination.

Recovery *(rebuild stronger & more resilient)*	- Conduct **Equity Impact Assessments** before approving reconstruction to avoid reinforcing inequalities.- Prioritise **adaptive retrofitting** (floodproofing, insulation, shading) over relocation, except for **critical infrastructure**.- Safeguard **tourism and cultural heritage** by prioritising rapid restoration of historic sites, safe beaches, and hospitality facilities.- Adopt a **long-term, nature-based coastal strategy** to address erosion and redirect development away from high-risk zones.	- Embed **EIAs into Development Planning and Civil Protection frameworks**, making them mandatory in recovery approvals.- Publish **guidelines for adaptive retrofitting** in high-risk zones and heritage areas.- Use **EU Solidarity Funds, RescEU, and national grants** for climate-proofing and heritage restoration.- Establish **participatory planning processes** for affected communities.- Develop **technical toolkits and training** for planners and councils on equity, adaptation, and heritage protection.	- **Planning Authority** enforces EIAs and zoning revisions.- **Civil Protection Department** integrates equity into recovery frameworks.- **Ministry for Tourism** and **Superintendence of Cultural Heritage** lead restoration of cultural and tourism assets.- A **cross-sectoral EIA review panel** (planning, social policy, disaster management, heritage experts) ensures recovery projects balance resilience and equity.- **Local councils** act as liaison between communities and national authorities during rebuilding.

Climate Risks – Ecological Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- **Restore and strategically use natural floodplains** as buffers to absorb floodwater, protect urban areas, and enhance biodiversity.- Launch a **National Urban Greening Programme** to expand tree planting, install green roofs/living walls, and integrate vegetation in all major developments.- **Enforce exclusion zones** in high-risk floodplains and coastal areas while promoting adaptive reuse of inland sites.- Promote **nature-based coastal defences** to protect against erosion (dune restoration, vegetated buffers, reef systems) as alternatives to short-term concrete solutions.- Integrate **ecological corridors and green infrastructure** into spatial planning to strengthen biodiversity and regulate microclimates.	- **Amend spatial planning laws** to designate natural floodplains as protected areas and embed hazard maps into zoning and permitting.- Establish a **National Urban Greening Programme** with mandatory requirements for public buildings, combined with grants/tax incentives for private retrofits.- Develop **technical guidelines** for controlled flooding, ecological corridor design, and nature-based coastal defence.- Launch **public awareness campaigns** (Maltese + English) to promote green roofs, water-sensitive urban design, and co-benefits of biodiversity.- Use **EU funds** (LIFE, ERDF, Horizon Europe, Green Deal) to support ecological restoration and urban greening at scale.	- **Planning Authority** enforces zoning exclusions and greening codes.- **Stormwater Unit (PWD)** and **National Flood Relief Project (NFRP)** ensure floodplain restoration is linked to drainage strategies.- **Ministry for Transport & Infrastructure** integrates green infrastructure into public works.- **Ambjent Malta** delivers greening projects at street and neighbourhood level.- **Local councils** mobilise communities in planting and maintenance.- Oversight by a **cross-ministerial coordination platform** to align planning, flood management, and adaptation policies.
Preparedness *(ensure readiness before hazards occur)*	- **Optimize groundwater management** with real-time monitoring to balance demand and safeguard water quality.- Promote **climate-resilient crops** adapted to droughts, storms, and floods, while supporting sustainable farming practices.- Expand **green infrastructure** (parks, gardens, rooftops) to enhance ecosystem services and buffer climate shocks.- Develop a **Coastal Resilience Plan** prioritising dune restoration, vegetation buffers, and reef pilots, with strong community engagement in monitoring and upkeep.	- Establish a **National Groundwater Management Framework** mandating monitoring via a centralised database.- Introduce **pollution remediation protocols** for identified groundwater hotspots.- Provide **CAP and Horizon Europe subsidies** for resilient crops and farmer training.- Embed **green infrastructure expansion** into urban planning codes, with ERDF/NextGenEU financing.- Adopt a **Coastal Resilience Masterplan** financed through LIFE/Interreg, with technical guidance for nature-based coastal defences.-	- **Water Services Corporation (WSC)** oversees groundwater monitoring and remediation.- **Agriculture Directorate** promotes resilient crop cultivation with CAP/Horizon support.- **Stormwater Unit (PWD)** and **NFRP** align green infrastructure and hazard mapping.- **Planning Authority** integrates coastal buffers into zoning.- **Local councils & NGOs** (Nature Trust, BirdLife) manage local greening and coastal monitoring.- Oversight by a **cross-sectoral**

		Implement **community-driven coastal monitoring** using NGOs and local councils.	**steering committee** to track EU fund applications and ensure compliance.
Response *(immediate actions during/after hazards)*	- Establish a **region-wide "Climate Buffer Network"** by restoring floodplains, rewetting wetlands/peatlands, and creating blue-green corridors that serve multiple functions: absorbing floods, storing soil moisture, and cooling cities.- Mobilise **rapid ecological response measures** to protect sensitive habitats (wetlands, dunes, fisheries) during storms and floods.- Ensure **emergency eco-monitoring** of water quality, species die-offs, and invasive species during events.	- Legally protect **floodplains and peatlands** through environmental designations.- Integrate **urban blue-green corridors** into spatial regulations.- Access **EU funds** (LIFE, ERDF, Interreg) for restoration and connectivity projects.- Publish **technical guidance** for best-practice restoration and corridor design.- Run **community engagement programmes** to involve residents in monitoring and emergency stewardship.- Deploy **real-time ecological monitoring** linked to meteorological and disaster warning systems.	- **ERA** leads ecological response and habitat protection.- **Planning Authority** ensures blue-green corridors are embedded in urban plans.- **Stormwater Unit (PWD)** coordinates retention measures with NFRP.- **Local councils & NGOs** mobilise local communities for eco-buffer protection.- **National Flood Relief Project** provides scientific data for targeted action.- A **dedicated cross-agency steering committee** aligns environmental protection with emergency response.
Recovery *(rebuild stronger & more resilient)*	- Apply **Build Back Better principles** to restore and relocate assets away from ecological hotspots and high-risk areas.- Integrate **climate-resilient design and land-use planning** into recovery permits.- Launch **ecosystem restoration programmes** (coasts, wetlands, dunes, native replanting) to rebuild natural buffers and enhance biodiversity post-disaster.- Ensure **co-benefits for tourism, community health, and ecosystem services** are central to recovery investments.	- Embed **mandatory climate risk assessments** into all reconstruction permits.- Update **building codes and recovery frameworks** to require resilient designs.- Provide **financial incentives and low-interest loans** for resilient construction and ecological restoration.- Leverage **EU funds** (ESIF, NextGenEU, Solidarity Fund) for climate-resilient rebuilding.- Develop **technical standards and monitoring systems** for resilient design and ecological recovery.- Engage citizens through **participatory planning workshops** in affected communities.	- **Civil Protection Department** and **Planning Authority** enforce resilient rebuilding standards.- **Ministry for Environment, Climate Change and Planning** ensures integration of climate risks.- **Ambjent Malta** delivers ecosystem restoration programmes.- **Local councils** support community participation and ecological recovery.- **NFRP and social services** address vulnerability concerns.- A **multi-agency Recovery Task Force** manages EU fund allocation and ensures transparent, inclusive recovery processes.

Climate Risks – Technological Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- **Modernise stormwater systems** by separating rainwater from wastewater networks to prevent sewage overload, especially in flood-prone zones.- Implement **blue-green infrastructure** (green roofs, permeable pavements, rain gardens, retention ponds) to capture and reuse runoff locally.- **Boost transport resilience** by embedding climate risk assessments into all stages of planning, construction, and maintenance, using flood- and heat-resistant designs.- **Renovate existing buildings** for energy efficiency and heat resilience with passive solar protection, green walls/roofs, reflective	- **Mandate separation of stormwater and wastewater networks** through updated water management legislation, with enforcement in high-density, flood-prone areas.- Update **transport design standards** to include climate-adaptive materials and elevation requirements, backed by GIS-based risk mapping.- Introduce **revised building codes** with compulsory insulation and passive design standards, supported by financial incentives (grants, soft loans, tax credits).- Establish a **National Urban Greening and Retrofit Programme** with subsidies and technical guidance for households and businesses.- Mobilise **EU funding** (ERDF,	- **Stormwater Unit (PWD)** leads drainage separation and blue-green infrastructure.- **Water Services Corporation (WSC)** ensures coordination with wastewater networks.- **Transport Ministry & Transport Malta** oversee resilient transport planning and standards.- **Planning Authority** enforces updated building codes and zoning.- **Local councils** implement greening and retrofits at street level.- Oversight by a **multi-agency steering group** (PWD, PA, WSC, ERA, NFRP) ensures integrated planning and funding alignment.

	materials, and smart systems.- **Update building codes** to require mandatory insulation and resilience standards in all new and retrofitted projects.	LIFE, Horizon Europe) for stormwater upgrades, transport retrofits, and building efficiency programmes.- Develop **digital monitoring platforms** for building compliance, drainage performance, and energy use.	
Preparedness *(ensure readiness before hazards occur)*	- **Enforce coastal land-use restrictions** to prevent development in hazard-prone areas, prioritising protection of wetlands and dunes.- **Promote alternative water sources** through wastewater reuse, plant-based filtration, and nutrient recovery systems.- Designate **schools, community centres, and sports fields** as **dual-use cooling shelters and relief hubs** with backup power and climate-ready infrastructure.- Install **automated misting points** at transport hubs and hospital entrances to reduce heat stress.	- Adopt **zoning laws** that prohibit new development in floodplains/coastal zones and require climate risk assessments in all proposals.- Develop a **National Water Reuse Strategy**, mandating integration of treated wastewater in agriculture and industry.- Provide **financial incentives** (CAP, LIFE, Green Deal funds) for innovative water reuse and plant-based purification technologies.- Establish **technical standards for dual-use shelters**, covering power, ventilation, accessibility, and emergency equipment.- Upgrade public facilities with **modular shelter systems** and potable water points.- Implement **SMS alert systems and public drills** to direct residents to safe shelters during heatwaves and floods.	- **Planning Authority** enforces zoning restrictions.- **ERA & WSC** oversee water reuse and environmental quality.- **Ministry for Education & Sports Council Malta** lead the designation of schools/sports fields as relief nodes.- **Civil Protection Department (CPD)** coordinates shelter operations and alerts.- **Local councils** maintain shelters and support outreach.- A **multi-stakeholder platform** (PA, WSC, CPD, NGOs, ERA) ensures transparency, inclusivity, and long-term adaptation of preparedness plans.
Response *(immediate actions during/after hazards)*	- **Upgrade schools and sports fields** to function as **emergency relief nodes** with modular shelters, potable water taps, and independent solar/battery systems.- Operate **cooling shelters** during extreme heat events, with SMS alerts and accessible transport to direct vulnerable populations.- Deploy **automated misting systems** at hospitals and transport hubs to protect responders and patients.- Ensure **critical facilities (ports, airport, hospitals)** remain operational through redundancy and rapid repair protocols.	- Develop **technical standards** for emergency relief facilities (power, water, accessibility).- Secure funding for upgrades via **EU Civil Protection Mechanism, LIFE, and ERDF**.- Integrate **automated cooling technologies** into existing public infrastructure with pilot programmes and scaling incentives.- Sign **operational agreements** with NGOs and private operators for shelter management.- Conduct **scenario-based exercises** simulating prolonged inundation, heatwaves, and power disruptions.- Create a **real-time infrastructure monitoring system** for transport, energy, and health facilities during crises.	- **Civil Protection Department** activates relief nodes and coordinates emergency logistics.- **Ministry for Education & Sports Council Malta** manage dual-use facilities.- **Health Ministry** and **Transport Malta** operate misting points and ensure hospital/transport continuity.- **Local councils & NGOs** support shelter management and outreach.- A **dedicated Resilience Task Force** ensures alignment across infrastructure, health, and emergency services.
Recovery *(rebuild stronger & more resilient)*	- Apply **Build Back Better principles** to relocate assets from high-risk areas and integrate resilient designs into rebuilding.- Establish a **Post-Calamity Crisis Team** to investigate root causes, collect disaster data, and track recovery progress.- Use **ecosystem-based adaptation** (wetland restoration, green buffers) alongside infrastructure recovery to reduce future risks.- Ensure recovery investments prioritise **critical public infrastructure** (hospitals, schools, transport hubs) and vulnerable communities.	- Embed **mandatory risk-informed design** into reconstruction permits.- Revise **building codes and recovery frameworks** to integrate climate projections.- Provide **financial support** (EU Solidarity Fund, RRF, ESIF) for hazard-avoidant redevelopment and climate-smart rebuilding.- Establish a **national disaster data registry** and GIS platform to guide adaptive planning.- Create **technical guidelines** for resilient building materials and energy systems.- Engage communities in **participatory planning workshops** to ensure inclusive recovery.	- A **National Post-Disaster Recovery Authority** leads coordination across ministries.- **Civil Protection Department** ensures recovery is risk-informed.- **Planning Authority** enforces resilient rebuilding standards.- **Ministry for Environment, Climate Change & Planning** integrates climate risks.- **Universities and research institutes** provide technical expertise and data analysis.- **Local councils** and social services support community recovery.- A **multi-agency Recovery Task Force** oversees fund allocation, transparency, and public reporting.

Geopolitical Risks – Social Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- **Launch targeted programmes** to build **social cohesion and digital literacy**, reducing risks of terrorist recruitment and exposure to cyber-misinformation.- Prioritise **youth engagement and civic participation** to strengthen trust in democratic institutions.- Develop **public resilience campaigns** that counter disinformation and promote critical digital skills in schools and communities.- Foster **inclusive community hubs** (youth centres, cultural clubs, parish groups) as safe spaces that strengthen cohesion and reduce vulnerability to extremist narratives.	- Integrate **digital literacy and civic education** into national curricula and adult learning programmes, aligned with EU Digital Education Action Plan.- Mobilise **EU funding** (Erasmus+, Citizens, Equality, Rights and Values (CERV), Digital Europe Programme) to support digital literacy and inclusion projects.- Launch **national awareness campaigns** in Maltese and English on media literacy, fact-checking, and responsible online behaviour.- Support **community-based initiatives** through small grants for NGOs and councils to run dialogue programmes, mentoring, and intercultural exchanges.- Encourage **public-private partnerships** with tech companies and media outlets to counter misinformation.	- **Ministry for Education, Sport, Youth, Research and Innovation** leads digital literacy in schools and training.- **Ministry for Home Affairs, Security, Reforms and Equality** oversees social cohesion and counter-radicalisation.- **Malta Digital Innovation Authority (MDIA)** and **MITA** support cyber-literacy frameworks.- **Commissioner for Children, SOS Malta, Richmond Foundation** ensure outreach to youth and vulnerable groups.- **Local councils** deliver neighbourhood initiatives and outreach.
Preparedness *(ensure readiness before hazards occur)*	- **Develop a national strategy** to protect critical infrastructure in **banking, finance, ICT, energy, food provision, water, and telecoms** against cyber, hybrid, and physical threats.- Require **continuity planning and emergency preparedness** for all critical service providers.- Strengthen **public-private cooperation** for information sharing, risk analysis, and incident coordination.- Establish **sector-specific resilience hubs** to simulate and rehearse coordinated responses.	- Pass **national legislation** mandating business continuity planning and cyber-resilience in line with EU directives (NIS2, DORA, CER Directive).- Require **regular risk and impact assessments** for all operators of essential services, with compliance audits.- Establish **incident reporting frameworks** with binding timelines and penalties for non-compliance.- Mobilise **EU funds** (Digital Europe, Internal Security Fund, RescEU, Technical Support Instrument) for cybersecurity upgrades, staff training, and scenario-based simulations.- Develop **industry guidelines and voluntary codes of practice** to complement legal requirements.- Set up **secure digital platforms** for information sharing between regulators, government, and private providers.	- **Critical Infrastructure Protection Directorate (Home Affairs Ministry)** leads multi-hazard coordination.- **National Cybersecurity Steering Committee** integrates ICT and cyber resilience.- **MFSA, Central Bank of Malta, MCA** regulate finance and telecom resilience.- **MITA** manages state ICT systems and threat intelligence coordination.- **Civil Protection Department** and **OPM's Crisis Management Committee** ensure integration into national emergency planning.- **Private operators** (finance, energy, ICT, telecoms) join formalised risk-sharing and incident response frameworks.
Response *(immediate actions during/after hazards)*	- **Identify, modernise, and expand public shelters**, repurposing basements, cultural heritage sites, and new builds into **multi-purpose, multi-hazard shelters**.- Ensure shelters are equipped with **ventilation, water supply, communication systems, backup power, and accessibility standards**.- **Publicly map and communicate shelter locations** to build trust and encourage preparedness.- Involve **local communities in shelter management** to ensure inclusivity and long-term upkeep.-	- Enact **urban development regulations** requiring shelters in new public buildings and large private developments.- Create a **National Shelter Strategy** integrating multi-hazard resilience and equitable access.- Access **EU funding** (ERDF, Just Transition Fund, LIFE) for shelter upgrades and construction.- Develop **participatory planning processes** with local communities for site selection and governance.- Publish **digital and physical maps** of shelters, combined with **public communication campaigns** on their use.- Run **regular shelter drills** in schools, workplaces, and communities.	- **Civil Protection Department** leads shelter standards, activation, and public communication.- **Planning Authority** ensures integration of shelters into building and zoning regulations.- **Ministry for National Heritage, Arts and Local Government** collaborates on cultural site adaptation.- **Heritage Malta & Local councils** identify and manage heritage-based shelters.- **NGOs and residents' associations** support shelter governance, outreach, and trust-building.

	Upgrade **civil defence infrastructure** to address modern threats (air raids, CBRNe, cyber-related blackouts, heatwaves).		
Recovery *(rebuild stronger & more resilient)*	- **Rebuild social trust and cohesion** after crises through dialogue programmes, youth engagement, and psychosocial support.- Provide **counselling and reintegration services** for affected populations, particularly youth and vulnerable groups.- Use **Build Back Better principles** to relocate or redesign vulnerable community spaces, ensuring equity and safety.- Launch **national reflection and learning exercises** to capture lessons and prevent repetition of mistakes.	- Establish **recovery funds** dedicated to social resilience, complementing the EU Solidarity Fund.- Deploy **community-led recovery toolkits** to help local councils and NGOs design inclusive programmes.- Introduce **digital platforms** for community feedback and lessons learned.- Mobilise EU and national funds for **cultural heritage restoration** where heritage shelters or community hubs were impacted.- Embed **equity impact assessments** into all post-crisis recovery projects.	- **Ministry for Social Policy and Children's Rights** leads community reintegration.- **Civil Protection Department** coordinates recovery planning with councils.- **Ministry for Education & Youth organisations** rebuild civic participation and trust.- **Heritage Malta, NGOs, and local councils** restore heritage/community spaces.- **Office of the Prime Minister** oversees Build Back Better integration into recovery frameworks.

Geopolitical Risks – Ecological Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- **Identify and secure key ecological infrastructures** (wetlands, coasts, water treatment systems, biodiversity reserves, desalination-related outfalls) against terrorist sabotage or cyber-physical attacks.- Implement **physical protections** (perimeter security, surveillance, access control) and **cyber protections** (secure IT/SCADA systems, firewalls, intrusion detection).- Integrate **environmental risk mapping** into national security assessments to prioritise ecological assets at risk.- Ensure **redundancy and resilience** of vital ecological functions, e.g., backup water treatment capacity.	- Mandate **risk mapping of ecological infrastructures** under the **CER Directive and NIS2 Directive**.- Introduce **technical standards** (e.g., ISO 27001 for environmental IT systems, EU cyber resilience standards for IoT sensors).- Require **environmental risk assessments** to be embedded in national infrastructure protection plans.- Access **EU funding** (Internal Security Fund for protective infrastructure, LIFE Programme for ecological monitoring, Horizon Europe for secure-by-design R&D).- Provide **guidance toolkits** for ecological site operators to self-assess vulnerabilities and upgrade protections.	- **ERA** and **Ministry for the Environment, Energy & Enterprise** oversee ecological asset identification and standards.- **Ministry for Home Affairs & Critical Infrastructure Protection Directorate** integrate ecological sites into the national infrastructure register.- **Malta Security Service (MSS)** assesses threat vectors.- **WSC & Ambjent Malta** secure operational/natural assets.- **University of Malta** (Institute for Climate Change and Sustainable Development) supports science-based planning.
Preparedness *(ensure readiness before hazards occur)*	- Deploy **integrated sensor networks** to monitor water quality, air quality, and habitat conditions with **cybersecurity protections** against manipulation or intrusion.- Develop **early warning systems** linking ecological data to disaster response platforms.- Train **staff and volunteers** in secure handling of ecological monitoring systems.- Build **community trust** through transparent communication of risks and safeguards.	- Require ecological monitoring systems to meet **cybersecurity standards** (aligned with **NIS2 & Cyber Resilience Act**).- Introduce **guidelines for secure-by-design IoT sensors and monitoring networks**.- Fund deployment via **Digital Europe, LIFE, Horizon Europe (Clusters 5 & 6)**.- Develop **vulnerability testing protocols** and certification standards for ecological IT systems.- Establish **data-sharing standards** across ERA, WSC, CPD, and NGOs.- Encourage **public-private partnerships** with IoT vendors and environmental tech firms.	- **MITA** leads cybersecurity integration for monitoring networks.- **ERA & WSC** deploy and operate ecological sensors in sensitive zones.- **CPD & MCCAA** ensure compliance with safety and technical standards.- **Local councils and NGOs** (Nature Trust, BirdLife) engage in community-based ecological monitoring.- A **multi-agency coordination platform** links environmental, ICT, and security authorities.

Response *(immediate actions during/after hazards)*	- Develop **emergency protocols for ecological terrorism or sabotage**, e.g., deliberate chemical releases in water or bioterror incidents in reserves.- Ensure **rapid containment and decontamination** capacity for affected soils, water systems, and habitats.- Conduct **simulation exercises** involving ecological, health, and security agencies.- Communicate clearly with the public to avoid misinformation or panic.	- Legally embed ecological terrorism response protocols into the **National Civil Protection Framework**.- Require **water utilities, protected area managers, and environmental authorities** to maintain incident response plans.- Fund specialised response equipment via **RescEU, Union Civil Protection Mechanism, ISF**.- Conduct **regular national exercises** (tabletops, field drills) simulating ecological sabotage.- Develop **inter-agency coordination templates** and rapid community response guidelines.	- **Civil Protection Department** leads emergency activation.- **Ministry for Home Affairs & ERA** co-develop protocols for ecological sabotage.- **WSC & Ambjent Malta** operate decontamination and site-level responses.- **Public Health Directorate** ensures bioterror scenarios include human health protection.- **OPM's Crisis Management Committee** coordinates inter-ministerial action.
Recovery *(rebuild stronger & more resilient)*	- Establish a **dedicated national fund for ecological recovery** after deliberate attacks or cyber-induced disasters.- Implement **rapid restoration projects** (reforestation, habitat restoration, wetland remediation, water system decontamination).- Deploy **rapid ecological assessment teams** to guide interventions.- Ensure **community engagement** in recovery efforts to rebuild trust and stewardship.- Integrate recovery lessons into long-term adaptation strategies.	- Create a **legally enshrined recovery fund** for ecological restoration, administered through environment or national security legislation.- Access **EU support** (LIFE, Cohesion Fund, EU Solidarity Fund, Recovery and Resilience Facility).- Develop **technical restoration toolkits** and restoration standards for operators.- Explore **green bonds and co-financing mechanisms** to mobilise private investment.- Train **rapid response ecological teams** combining scientists, NGOs, and local wardens.	- **Ministry for Environment & Ministry for Finance** establish and administer the recovery fund.- **ERA & Ambjent Malta** lead on project delivery and ecological restoration planning.- **University of Malta** supports ecological assessments and monitoring.- **NGOs and local councils** engage communities in restoration.- **Office of the Prime Minister** activates cross-sector recovery coordination when national-scale damage occurs.

Geopolitical Risks – Technological Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- **Modernise Malta's shelter network**, retrofitting existing facilities (Figure 5) with **ventilation, filtration, backup power, and secure communications**.- **Digitally map shelters** and provide **real-time occupancy dashboards**, linked to wayfinding signage in urban centres.- **Preserve heritage shelters** while upgrading them to multi-hazard standards (air raids, CBRNe, blackouts, extreme heat).- Embed **resilience into public infrastructure planning**, ensuring dual-use community facilities serve as both civic amenities and emergency shelters.	- Update **national building codes and Civil Protection regulations** to require modern filtration, ventilation, and digital communications in shelters.- Establish a **National Urban Resilience Strategy** with clear technical standards for shelters and signage.- Mobilise **EU funds** (ERDF, RescEU, Digital Europe, Connecting Europe Facility) for retrofitting, smart mapping, and signage infrastructure.- Provide **public guidance and education** on shelter use, supported by awareness campaigns and community drills.	- **Civil Protection Department (CPD)** leads shelter modernisation and emergency planning.- **Infrastructure Malta & Ministry for Public Works and Planning** manage physical retrofits.- **MITA** oversees digital mapping and occupancy dashboards.- **Local councils** implement signage, maintenance, and local outreach.- **Heritage Malta** ensures adaptation of historic shelters while preserving cultural value.- **Armed Forces of Malta (AFM)** and **Home Affairs Ministry** coordinate shelter use during crises.
Preparedness	- **Secure supply chains** by diversifying critical goods (energy, food, medicine) and **mapping alternative transport routes**.- Strengthen **port and airport resilience** with redundancy protocols.- Establish	- Introduce **legally binding risk assessments and continuity planning** for key sectors (energy, food, medicine, ICT, logistics).- Require operators to develop **emergency stockpiling and redundancy plans**.- Use **EU support** (Connecting	- **Ministry for Transport, Infrastructure and Capital Projects** and **Transport Malta** map and secure logistics routes.- **Foreign & European Affairs Ministry** develops strategic partnerships

(ensure readiness before hazards occur)	**contingency frameworks** with risk assessments, stockpiling, and pre-arranged trade agreements.- Conduct **simulation exercises** to test continuity of essential services during disruptions.	Europe Facility, InvestEU, Horizon Europe Cluster 3) for logistics hubs and supply diversification.- Develop **bilateral and regional agreements** with EU and Mediterranean partners to secure critical imports.- Provide **toolkits and modelling software** to operators for contingency planning.- Run **joint simulation exercises** for ports, airports, and Freeport facilities.	and trade agreements.- **Malta Chamber of Commerce & Freeport Corporation** coordinate private sector preparedness.- **CPD & National Emergency Coordination Committee** ensure supply chain resilience is embedded into national crisis planning.
Response *(immediate actions during/after hazards)*	- Establish a **Regional Real-Time Operations Centre** integrating **civil protection, cybersecurity, telecoms, and power grid operators**.- Ensure **live data feeds** from each sector (energy, ICT, transport, emergency logistics) for anomaly detection and unified alerts.- Deploy **standardised incident response protocols** and enable secure interagency communication.- Conduct **joint training and live simulations** to build readiness.	- Enact a **national cybersecurity and civil protection law** mandating interagency data-sharing and response protocols.- Fund technical infrastructure via **Digital Europe, ISF, and RescEU**.- Sign **Memoranda of Understanding (MoUs)** between CPD, MITA, Enemalta, MCA, and AFM for lawful, secure data exchange.- Run **joint operational drills** across agencies, simulating cyber-physical and hybrid crises.- Establish **dedicated staff and budget** to ensure sustained centre operations.	- **CPD** coordinates crisis response and civil protection.- **MITA** manages cyber resilience and IT integration.- **Enemalta & Malta Communications Authority (MCA)** oversee energy and telecoms continuity.- **Malta Police Cyber Crime Unit** and **AFM** provide law enforcement and national security support.- **Transport Malta** provides situational awareness for ports, airports, and land transport.- Oversight by an **Interagency Crisis Operations Council**, chaired by the **Office of the Prime Minister (OPM)**.
Recovery *(rebuild stronger & more resilient)*	- Establish a **National Disaster Recovery Fund** with pre-allocated reserves to enable rapid reconstruction of **infrastructure, housing, and essential services (such as food provision)**.- Ensure **fast-track budget mobilisation** and household/business support mechanisms.- Embed **climate-smart and risk-informed design** into all reconstruction.- Create a **post-calamity crisis assessment team** to document disaster data, root causes, and lessons for policy reform.	- Enact **legislation establishing the Recovery Fund** with pre-allocated budget lines and automatic triggers.- Link the Fund to **EU Solidarity Fund, Cohesion Funds, and RRF** for co-financing.- Establish **rapid disbursement procedures** via digital claim portals and simplified eligibility.- Provide **technical standards for resilient rebuilding** aligned with EU adaptation guidelines.- Develop **real-time monitoring dashboards** to track recovery progress and transparency.- Create **multi-stakeholder oversight boards** (gov't, NGOs, academia) to ensure accountability.	- **Ministry for Finance & Employment** manages the Recovery Fund.- **CPD, Ministry for Social Policy, and Housing Authority** implement household and community-level recovery.- **Local councils** conduct initial recovery assessments.- **National Audit Office (NAO)** provides independent oversight of fund allocation.- **University of Malta** and technical experts document lessons and integrate them into future planning.- **OPM** issues a **National Disaster Recovery Framework** outlining roles, workflows, and triggers.

Public Health Risks – Social Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- Establish **integrated syndromic and event-based surveillance systems** to detect outbreaks after floods or disasters, focusing on respiratory, gastrointestinal, and vaccine-preventable illnesses.- Ensure **continuous reporting of clinical symptoms** (e.g., diarrhoea, fever with rash/cough) and **immediate alerts** for severe cases (e.g., meningitis, measles).- Strengthen **linkages between hospitals, clinics, and environmental health monitoring** for a One Health approach.- Build **community trust in reporting** through transparent feedback and community involvement.	- Update the **Public Health Act (Cap. 465)** to mandate reporting thresholds for syndromic surveillance.- Develop **digital platforms** for real-time data sharing across hospitals, primary care, labs, and meteorological services.- Provide **training modules and guidance protocols** for frontline staff and community health workers.- Mobilise EU funds (EU4Health, Horizon Europe, ESF+) for surveillance upgrades and laboratory capacity.- Run **awareness campaigns** on early symptom reporting in Maltese and English.	- **Department of Public Health (Ministry for Health)** leads integration of surveillance systems.- **Health Promotion and Disease Prevention Directorate** coordinates disease-specific monitoring.- **Environmental Health Officers** and **regional protection teams** link health data with flood/drought events.- **Civil Protection Department (CPD)** and **Meteorological Services** provide early warning and situational awareness.- **Primary Health Care Services** ensure community-level detection.
Preparedness *(ensure readiness before hazards occur)*	- Map and designate **vaccination sites** prioritising vulnerable groups, ensuring equitable geographic coverage.- Develop **flexible, dual-use community facilities** (schools, parish halls, sports centres) that can switch to vaccination hubs during crises.- Establish a **National Community Resilience Registry** of local leaders, health workers, volunteers, and critical resources.- Introduce a **Public Health Emergencies Act** to clarify authority, roles, and secure **ring-fenced funding** for crisis preparedness.- Conduct **annual simulation exercises** involving local councils, CPD, and volunteer networks.	- Adopt a **national vaccination site mapping framework** with clear coverage targets (≥70% population), especially for high-risk groups.- Deploy **mobile vaccination units** financed through EU funds (CERV, ESF+, EU4Health).- Legally mandate the **Community Resilience Registry**, with safeguards for data privacy and secure management.- Enact a **Public Health Emergencies Act** defining decision-making powers, funding triggers, and inter-agency coordination.- Run **multi-agency drills** annually to test readiness of vaccination systems and emergency coordination.	- **Health Promotion & Disease Prevention Directorate** leads vaccination strategy.- **National Immunisation Office** oversees vaccine logistics and quality.- **Local councils and community centres** provide sites and outreach.- **NGOs and faith-based groups** (Caritas, parish networks) extend outreach to vulnerable communities.- **Ministry for Health & CPD** oversee the registry and operational drills.- **Superintendent of Public Health** gains clear authority under the Emergencies Act.
Response *(immediate actions during/after hazards)*	- Ensure **equitable access to well-equipped healthcare facilities** (emergency, ICU, resuscitation) in both urban and rural regions to manage surges.- Establish **disease-safe evacuation shelters** with space for distancing, hand hygiene, PPE, and ventilation.- Secure **uninterrupted WASH services** in disaster-hit zones with emergency water points and early contamination detection.- Deliver **trusted public health communication** on hygiene and outbreak control through local leaders, councils, and social media.	- Invest in **expanding ICU and emergency capacity** in hospitals, especially where workforce shortages exist.- Update **shelter design standards** to include infection prevention and control measures.- Integrate **WASH services** into flood and drought contingency planning (emergency water distribution, quality testing).- Provide **targeted workforce training** for surge health response.- Finance upgrades via EU Solidarity Fund, Recovery and Resilience Facility, and national health budgets.- Run **community communication campaigns** on water safety and hygiene.	- **Ministry for Health & Hospital Services Directorate** lead capacity expansion and workforce surge planning.- **Health Workforce Agency** tackles staff shortages and retention, focusing on at-risk regions.- **CPD & local councils** co-manage disease-safe shelters.- **WSC & Environmental Health Officers** ensure WASH continuity and water safety communication.- **Public Health Department** oversees hygiene and NPI protocols in shelters.- NGOs (St John Ambulance, Red Cross) provide surge volunteer support.
Recovery	- Implement **long-term community rebuilding programmes** that restore social networks, reduce displacement impacts, and address mental health needs.-	- Establish a **post-crisis evaluation framework** with independent reviews of health response effectiveness.- Channel EU and national funds (Solidarity Fund, ESF+, RRF) into	- **Ministry for Health & Hospital Services Directorate** lead healthcare rebuilding.- **CPD, Public Health Department, and Social Services** support

(rebuild stronger & more resilient)	Strengthen **equitable healthcare access** in underserved regions, reducing gaps exposed during crises.- Ensure **post-crisis evaluation and data collection** feeds back into public health policies.- Use recovery to invest in **climate-smart health infrastructure** and resilient WASH systems.- Support **social integration initiatives** to rebuild trust and community resilience.	rebuilding resilient hospitals, clinics, and WASH systems.- Develop **technical standards** for climate-resilient hospitals (energy efficiency, heat-proofing, flood resistance).- Provide **mental health support programmes** for affected populations and healthcare workers.- Create **community-led recovery councils** to ensure local voices shape rebuilding.	recovery of displaced populations.- **WSC** leads resilient WASH restoration.- **Health Promotion Directorate** ensures community engagement and mental health support.- **Local councils** coordinate social integration initiatives.- Oversight by an **inter-ministerial Recovery Task Force** ensures transparent fund allocation and equity.

Public Health Risks – Ecological Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- Develop and expand **ecological surveillance systems** to monitor **wildlife populations, coastal wetlands, and freshwater reservoirs** for zoonotic pathogens and chemical pollutants.- Ensure **continuous ecological monitoring** to detect early signals of outbreaks linked to water contamination or vector-borne diseases.- Promote **cross-sectoral data integration** between environmental and health authorities to build a **One Health surveillance system**.- Strengthen **ecological resilience** through nature-based solutions that reduce contamination risks (e.g., wetland buffers, vegetated riparian zones).	- Amend the **Public Health Act and Environmental Protection legislation** to mandate pathogen and pollutant screening in wetlands, aquifers, and rural habitats.- Establish **standardised ecological sampling protocols** and an **eco-risk assessment toolkit** for operators.- Build a **shared data platform** linking ERA, Ministry of Health, and CPD for early warning integration.- Access **EU funding** (LIFE for biodiversity surveillance, Horizon Europe for One Health R&D, ESF+ for training environmental health professionals).- Conduct **capacity-building programmes** for local wardens and NGOs in surveillance techniques.	- **Environment and Resources Authority (ERA)** leads ecological surveillance integration.- **Ministry for Health & Food Safety Commission** ensure alignment with disease control priorities.- **Ambjent Malta & local councils** implement field monitoring.- **University of Malta** provides scientific expertise and training.- **CPD** coordinates integration of surveillance into disaster risk management.
Preparedness *(ensure readiness before hazards occur)*	- Install **biosecurity buffer zones** around **urban green spaces, wetlands, and water sources** to minimise cross-species transmission and contamination.- Integrate **buffer zones into spatial planning** to safeguard ecosystems in flood- or drought-prone areas.- Develop **community-based ecological stewardship programmes** to ensure long-term maintenance of protective zones.- Use **urban greening projects** to combine biosecurity with climate resilience and public health benefits.	- Embed **biosecurity buffer zones** into **land-use regulations and the Strategic Plan for Environment and Development (SPED)**, aligned with ERA's Green Infrastructure framework.- Publish **ecological zoning maps and planning guidelines** for municipalities.- Finance buffer zones via **ERDF, Green Deal, and LIFE** for urban ecosystem strengthening.- Launch **community awareness campaigns** in Maltese and English on the role of buffer zones in preventing pandemics and protecting water quality.- Encourage **co-design with NGOs and residents** to ensure legitimacy and uptake.	- **ERA** and **Planning Authority** enforce buffer zone regulations.- **Local councils** and **Ambjent Malta** deliver urban greening and ecological buffers.- **NGOs and community groups** (e.g., Nature Trust Malta, BirdLife) co-design and maintain zones.- Oversight by a **Biosecurity Preparedness Coordination Group** linking ERA, Ministry for Health, and local stakeholders.
Response	- Deploy **rapid environmental decontamination teams** trained for **chemical, biological, or**	- Legally embed ecological decontamination protocols into the **National Civil Protection Framework**.- Procure **specialised**	- **Civil Protection Department (CPD)** leads activation of decontamination teams.- **ERA** provides

(immediate actions during/after hazards)	**radiological contamination** in water systems, soil, and public spaces.- Establish **mobile eco-response units** with specialised technology (portable water treatment, soil remediation, drone-based contamination mapping).- Run **joint field exercises** simulating ecological contamination during floods, pandemics, or CBRNe incidents.- Communicate transparently with communities about risks and safety measures to prevent panic.	**response equipment** (portable filters, mobile labs) financed through **RescEU, ISF, and Horizon Europe emergency preparedness calls**.- Develop **multi-agency coordination protocols** linking CPD, ERA, WSC, and municipalities.- Conduct **scenario-based tabletop exercises** and cross-border training drills.- Publish **public-facing guidance** on community roles during eco-contamination events.	technical oversight on ecological standards.- **WSC & Ambjent Malta** manage water and land remediation.- **Transport Malta's PIRU** supports pollution incident response.- **AFM & Malta Police** provide logistics and enforcement during containment.- Oversight from the **OPM's Crisis Management Committee** ensures cross-ministerial integration.
Recovery *(rebuild stronger & more resilient)*	- Implement **ecosystem restoration programmes** to remediate contaminated soils, wetlands, and aquifers after pandemics or CBRNe incidents.- Use **nature-based recovery solutions** (wetland restoration, reforestation, bioremediation) to enhance long-term resilience.- Deploy **rapid ecological assessment teams** to design site-specific recovery plans.- Ensure **community engagement** in restoration projects to rebuild trust and ecological stewardship.- Integrate recovery into **long-term adaptation and biodiversity strategies**.	- Enact **national restoration guidelines** mandating remediation of contaminated environments.- Create a **dedicated ecological recovery fund**, legally enshrined, with automatic budget triggers for crises.- Mobilise **EU funds** (LIFE, Solidarity Fund, Cohesion Fund, Recovery & Resilience Facility).- Develop **restoration toolkits and planning templates** for councils and NGOs.- Use **innovative financing models** (green bonds, blended public-private funding).- Train **rapid restoration teams** combining academic experts, NGOs, and local wardens.	- **ERA** and **Ministry for Environment, Energy & Enterprise** lead ecological recovery.- **Ambjent Malta** implements restoration works on the ground.- **Local councils & NGOs** (Nature Trust, BirdLife) deliver community-based restoration and outreach.- **University of Malta** conducts impact assessments and long-term ecological monitoring.- **OPM** coordinates recovery when crises cross sectors, ensuring alignment with national adaptation strategies.

Public Health Risks – Technological Dimension

DMC Stage	Content (What)	Instruments (How)	Key Actors (Who)
Mitigation *(reduce risks before hazards happen)*	- Install **IoT-based air quality and pathogen detection sensors** in high-risk public spaces (schools, hospitals, transport hubs) to provide **early warnings of airborne pathogens or chemical agents**.- Integrate sensors with **AI-driven dashboards** for real-time analysis and alerts to facility managers and public health officials.- Build on Malta's existing **ESAIRQ indoor air quality sensor pilots**, scaling to national deployment in critical spaces.- Ensure **transparency of monitoring data** to build public trust.	- Establish **regulatory standards** for indoor pathogen/air quality monitoring, including alert thresholds and reporting protocols.- Integrate **IoT sensors** into the Building Regulation Act and Health & Safety frameworks.- Fund expansion via **Digital Europe, Horizon Europe (Cluster 1 – Health), and LIFE** for One Health monitoring.- Deploy **AI-enabled dashboards** to aggregate data, managed by MITA and Public Health.- Provide **training modules** for facility managers, school administrators, and council staff.	- **Ministry for Health** sets health thresholds and protocols.- **Ministry for Education** ensures rollout in schools.- **Transport Malta** oversees monitoring in transport hubs.- **MITA** manages data platforms, dashboards, and cybersecurity.- **Public Health Department** defines incident response protocols.- **Local councils and school administrators** maintain systems on the ground.

Preparedness *(ensure readiness before hazards occur)*	- Adopt **dual-use design standards** for public infrastructure (schools, municipal halls, clinics), ensuring they can function as **everyday community assets** and be rapidly converted into **shelters, vaccination centres, or command hubs (Figure 3)**.- Retrofit existing facilities with **backup utilities (power, water, ICT)**, adaptable layouts, and emergency equipment.- Prioritise **critical community facilities in underserved or rural areas** to close gaps in resilience.	- Amend the **Building Regulation Act** to require dual-use readiness in all new and major renovation projects.- Align standards with the **National Energy & Climate Plan** for efficiency and resilience.- Introduce **technical design handbooks** and certification schemes for dual-use facilities.- Provide **financial incentives** (grants, tax credits, low-interest loans) for retrofitting schools and municipal halls.- Mobilise EU support from **ERDF, InvestEU, and NextGenEU** for dual-use upgrades.- Conduct **multi-agency drills** to test conversion of facilities in crisis conditions.	- **Planning Authority** enforces dual-use building codes.- **Infrastructure Malta & Ministry for Infrastructure** oversee retrofits and upgrades.- **Building Regulation Office** integrates dual-use standards into inspections.- **CPD** provides technical input to ensure facilities meet emergency shelter and operations criteria.- **Local councils and school boards** coordinate local retrofits and preparedness.
Response *(immediate actions during/after hazards)*	- Deploy **modular isolation and decontamination units** with **negative pressure systems and automated chemical neutralisation** to outbreak or contamination zones.- Ensure units can be positioned near hospitals, ports, or affected neighbourhoods.- Train rapid-response medical and environmental teams in unit use and decontamination protocols.- Integrate deployment into **national CBRNe response frameworks**.	- Codify use of modular units through **emergency health regulations** under the Public Health Act.- Procure units via **ISF and RescEU**, supported by EU Civil Protection Mechanism.- Develop **operational protocols and maintenance standards** for safe use.- Run **training modules and tabletop exercises** for medical staff, CPD, and local volunteers.- Ensure **logistical support** for rapid deployment (AFM, Police, CPD).	- **Civil Protection Department (CPD)** oversees procurement and deployment logistics.- **Ministry for Health & Hospital Services Directorate** coordinate with hospitals for activation.- **OPM Crisis Management Committee** ensures cross-ministerial coordination.- **AFM & Malta Police** provide logistical support and security.- **Local councils** assist with site setup and community communication.
Recovery *(rebuild stronger & more resilient)*	- Build a **national resilience dashboard** to track post-crisis restoration of **healthcare, water, energy, and sanitation systems**.- Integrate **real-time performance metrics** on facility functionality, workforce availability, and supply chain recovery.- Use dashboard data for **transparent public communication** and to inform adaptive recovery planning.- Ensure recovery strengthens **long-term resilience of hospitals, clinics, and WASH systems**.	- Develop a **digital resilience dashboard** under MITA with cross-agency data integration.- Fund development and deployment through **Digital Europe Programme, Technical Support Instrument (TSI), and RRF**.- Establish **data-reporting protocols and interagency standards** for consistent updates.- Provide **public access portals** to increase transparency and accountability.- Embed dashboard use into the **National Disaster Recovery Framework**.	- **MITA** leads dashboard design, operation, and cybersecurity.- **Ministry for Health & WSC** feed in healthcare and WASH data.- **Sanitation Directorate** and **Hospital Services Directorate** provide technical updates.- **CPD** triggers dashboard activation in crises.- **Ministry for Finance** ensures funding continuity.- **OPM** uses dashboard for strategic coordination and recovery decision-making.

The nine recommendation tables developed for Malta across climate, geopolitical, and public health risks highlight a number of **cross-cutting needs that transcend individual hazards or sectors**. The analysis demonstrates that resilience for Malta cannot be achieved through siloed approaches, but requires **integrated governance, multi-functional infrastructure, robust surveillance, and equity-driven planning**. In particular, the tables emphasise that **public authorities must provide legal clarity, strategic leadership, and sustained funding**, while **private actors, utilities, NGOs, and local councils play essential operational roles** in maintaining systems, mobilising innovation, and engaging communities. This synthesis section distils the common priorities into an integrated framework for action.

Table 3 – Presents key cross-risk priorities across the four DMC phases in Malta, highlighting the complementary roles of public and private actors in coordinating mitigation, preparedness, response, and recovery efforts, which is essential for effective risk management and successful policy implementation.

DMC Stage	Cross-Risk Priorities	Municipal / Public Role	Private / Civic Role
Mitigation	Modernisation of dual-use infrastructure (shelters, schools, health centres) for multi-hazard functionality. Embedding resilience standards in building codes, planning, and environmental law. Expansion of One Health and ecological surveillance linking human, environmental, and digital systems. Institutionalisation of equity and access principles into all planning.	Pass and enforce legislation (Building Regulation Act revisions, Drainage Maintenance Act, Public Health Act updates). Integrate hazard maps and resilience standards into zoning and planning approvals. Lead development of national surveillance systems and reporting obligations. Ensure equitable distribution of resilient infrastructure across regions.	Invest in resilient retrofitting and green infrastructure in private buildings. Partner with government on IoT-based surveillance and data systems. Support workforce training and corporate social responsibility projects (e.g., cooling hubs, digital literacy).
Preparedness	Development of clear continuity plans for health, energy, food, and water systems. Expansion of vaccination hubs, community resilience registries, and biosecurity buffer zones. Use of multi-agency drills and public awareness campaigns to build readiness. Integration of local councils and NGOs into national preparedness frameworks.	Establish national frameworks (Public Health Emergencies Act, coastal zoning restrictions, CER/NIS2 compliance). Lead on mapping and designating vaccination/shelter sites. Finance simulation exercises and provide technical guidelines. Coordinate with EU civil protection and health agencies.	Critical infrastructure operators (ports, telecoms, utilities) prepare continuity and redundancy plans. NGOs and community groups mobilise volunteers and outreach. Private sector contributes to awareness campaigns and testing drills. Tech firms provide secure monitoring platforms and data-sharing solutions.

DMC Stage	Cross-Risk Priorities	Municipal / Public Role	Private / Civic Role
Response	Activation of rapid-response systems: modular health units, ecological decontamination teams, real-time operations centres. Ensuring continuity of essential services (healthcare, WASH, energy, communications, transport). Transparent public communication and trusted local leadership during crises. Deployment of dual-use facilities as shelters, command hubs, or relief nodes.	Civil Protection Department leads emergency activation across risks. Ministries coordinate sectoral responses (health, environment, transport, ICT). Local councils operate evacuation shelters, cooling hubs, and community support centres. Oversight by OPM Crisis Management Committee ensures cross-sector coordination.	Utilities (energy, water, telecoms) provide redundancy, repair, and real-time system data. Private contractors supply specialised equipment and rapid deployment capacity. NGOs deliver frontline relief and communication support. Media companies assist with trusted crisis messaging.
Recovery	Establishment of dedicated national recovery funds (disaster, ecological, health). Application of Build Back Better principles with climate-smart, risk-informed design. Use of dashboards and monitoring systems for transparent recovery progress. Integration of mental health, social cohesion, and equity assessments into long-term rebuilding.	Pass legislation for recovery funds with pre-allocated reserves. Ensure transparent fund allocation and oversight (e.g., NAO audits). Lead on national dashboards to track recovery. Coordinate with EU Solidarity Fund and Recovery Facility for co-financing. Support mental health and social reintegration programmes.	Construction sector integrates resilient building standards. Financial institutions provide green bonds and blended finance. NGOs and community councils lead local ecological restoration and social rebuilding projects. Universities and research centres contribute impact assessments and lessons learned.

6.1 Strategic shifts

The evidence also shows that in Malta, the **same infrastructures and systems are repeatedly exposed across risks**. Hospitals, schools, utilities, and transport corridors face pressures from **climate hazards** (floods, heat, droughts, storms), **geopolitical disruptions** (cyberattacks, supply chain shocks, armed conflict), and **public health crises** (pandemics, CBRNe). For example, **heatwaves and pandemics both require resilient hospitals and dual-use shelters**; **cyberattacks and floods alike threaten the continuity of energy and telecommunications systems**; while **droughts and geopolitical shocks both endanger Malta's fragile supply chains and water security**. We identify three strategic shifts:

1. **From fragmented governance to integrated national resilience coordination**
    - Resilience responsibilities in Malta are dispersed across ministries, regulators, and councils, which risks overlap and delay. A **National Resilience Coordination Council** under the Office of the Prime Minister should unify climate adaptation, public health, civil protection, and cybersecurity agendas.

- This Council would anchor **clear legal mandates, multi-agency coordination, and EU directive compliance** (CER, NIS2, Civil Protection Mechanism), while sectoral task forces (e.g. flood management, health emergencies, cyber-physical resilience) deliver on specialised priorities.

2. **From single-purpose facilities to dual-use, multi-hazard infrastructure**
   - Given Malta's high density and limited land, infrastructure must serve multiple roles. **Schools, municipal halls, and health centres** should be **retrofitted and redesigned as resilience hubs**: daily community assets in normal times, but also **emergency shelters, vaccination centres, or command hubs** during crises.
   - Dual-use standards — including **backup utilities, adaptable layouts, and emergency equipment** — should be embedded in building codes and retrofits, with investment prioritised in vulnerable or underserved communities.
3. **From government-led response to multi-actor resilience partnerships**
   - Resilience cannot be sustained by government alone. **Private utilities, community organisations, NGOs, and local councils** must be systematically embedded as partners in **surveillance, preparedness, and recovery**.
   - The **Southern Regional Council**, for example, can coordinate between national strategy and local delivery: ensuring maintenance of drainage, WASH systems, and ecological buffers; mobilising NGOs and community groups; and monitoring equity in service delivery.
   - By embedding **maintenance cycles, monitoring platforms (IoT, GIS, dashboards), and community drills** into these partnerships, Malta can shift from a reactive crisis culture to **proactive, sustained resilience** across all risks.

These shifts provide the foundations for a **Build Back Better spatial planning framework**, ensuring that recovery after crises does not reproduce old vulnerabilities. In operational terms, this framework requires spatial planners to apply a **Rebuild–Adapt–Relocate** logic.

Spatial Planning Framework

Rebuild only in low-risk areas, as defined by watertoets and forward-looking climate projections (2050/2100).

Renovate/adapt in moderate-risk areas, with mandatory adaptation measures included in renovation permits (e.g. green roofs, flood-proofing, shading).

Relocate from high-risk zones using land reallocation and compensation instruments.

These shifts, framed by Build Back Better principles, will allow Malta not only to respond to crises but to use them as opportunities for long-term adaptation and systemic resilience.

Making Malta more resilient means treating every investment as multi-purpose, every institution as part of a coordinated system, and every crisis as a chance to build back better. By uniting government, private utilities, and communities in a proactive resilience partnership, Malta can transform its small size from a vulnerability into an advantage — enabling agile, integrated, and future-proof resilience across all risks.

7 Transferability of Best Practices

The evidence tables for Malta highlight the need for **dual-use infrastructure, community-based preparedness, structured maintenance, equitable access, and cross-sectoral coordination**. These priorities are not isolated: they resonate with solutions already tested in other European regions and beyond. Best practices offer **transferable lessons that validate the Maltese recommendations**, showing how other contexts have operationalised resilience through regulation, planning, and partnerships.

For example, **where our evidence tables highlight the need for dual-use infrastructure and community preparedness, Lithuania's shelter regulations and Sweden's civil defence models provide useful benchmarks**. Similarly, **where we stress the importance of sustainable water management and drought resilience, Flanders' Rainwater Ordinance and Blue Deal 2.0 demonstrate how regulation and investment can shift practices at scale**. By examining these cases, Malta can adapt proven approaches to its own Mediterranean, small-island context.

7.1 Best Practices

Below we first list best practices relevant to Malta, indicating the type of risk each one addresses, the nature of the practice, its region of origin, the associated system (social, ecological or technological), and the relevant phase of the DMC (Table 4). These best practices are based on stakeholder feedback from the five regions, contributions from the European Council of Spatial Planners (ECTP) at the European level and the Executive Committee members (UK, Italy, Ireland, France, Norway, Slovakia, Belgium-Walloon, Austria), project consortium expertise, and additional research. Each best practice is then explored further using a 3-step logic: **Context, Relevance for Malta, Implementation in Malta.**

Table 4 - Overview of Selected Best Practices Relevant to Malta.

Relevant Risk	Best Practice	Region of Origin	System (SETS)	DMC Phase
Climate	Cross-Border Flood Agreement	Flanders	Social Technological	Preparedness Response Recovery
Climate	Rainwater Ordinance	Flanders	Ecological Technological	Mitigation
Climate	Flanders Blue Deal 2.0	Flanders	Social Ecological	Mitigation Preparedness
Geopolitical Climate	Shelter infrastructure and risk preparedness (Construction Technical Regulation)	Lithuania	Technological Social	Preparedness
Climate Geopolitical Public health	Data-Driven Spatial & Risk Planning (Aix-Marseille)	PACA	Social Ecological Technological	Mitigation Preparedness

Relevant Risk	Best Practice	Region of Origin	System (SETS)	DMC Phase
Climate Geopolitical Public Health	Cross-Sectoral Climate Governance (Inter-agency collaboration)	PACA	Institutional Social	Preparedness Response Recovery
Climate	Integrated Water Management (upgraded stormwater systems, NbS)	Enschede	Ecological Technological	Mitigation Preparedness
Climate (Heat Stress, Floods)	Adaptation Pyramid (multilayered safety framework)	Enschede	Ecological Technological Social	Mitigation Preparedness
Climate (Heat Stress, Drought)	Community engagement and climate justice ('GroenBlauw Enschede' program)	Enschede	Social	Mitigation Preparedness
Geopolitical	Counter-terrorism through spatial planning	United Kingdom, Edinburgh	Social Technological	Mitigation Preparedness
Geopolitical	Mapping evacuation routes on spatial planning maps (Chernihiv example)	Ukraine	Social Technological	Preparedness Recovery
Geopolitical	National Spatial Programme for Defence	Netherlands	Social Technological	Mitigation Preparedness

7.1.1 Example 1: Cross-Border Flood Agreement – Flanders

Context

In the Moeren region, flooding has long been a cross-border challenge between Flanders and France. To address it, a formal joint agreement was created to coordinate flood risk management. It provides for shared use of pumping stations and dikes, clear division of responsibilities, and automatic emergency protocols in case water levels exceed thresholds. The agreement turns a potential conflict of interests into structured cooperation.

Relevance for Malta

Although Malta has no land borders, it faces fragmented flood responsibilities across ministries, agencies, and councils. The same principle of formalised coordination and automatic triggers is directly applicable to Malta's urban flood management.

Implementation in Malta

Malta could replicate this by embedding formal agreements between the Stormwater Unit, Water Services Corporation, CPD, and local councils. A shared GIS platform with pre-agreed action triggers (e.g., rainfall thresholds automatically activating pumping and clearance) would ensure timely responses.

7.1.2 Example 2: Rainwater Ordinance – Flanders

Context

Introduced in 2023, the Rainwater Ordinance sets legal requirements for rainwater harvesting, reuse, and infiltration across new and renovated buildings. It mandates tank capacities (5,000–10,000 litres depending on

roof size), extends rules to renovations and small refurbishments, and emphasises reuse for non-potable purposes. This makes sustainable water management part of the building culture, not an optional add-on.

Relevance for Malta

Malta has a historic tradition of cisterns, but modern construction has often ignored rainwater capture. The evidence tables highlight the need to reduce flood pressure and improve drought resilience. A regulatory framework like the Flemish one would revive and modernise Malta's cistern culture.

Implementation in Malta

Amend the Building Regulation Act to require cisterns, reuse systems, and infiltration in new and renovated buildings. Provide financial incentives for retrofits and ensure enforcement through planning approvals and inspections.

7.1.3 Example 3: Blue Deal 2.0 – Flanders

Context

The Blue Deal is a cross-sectoral water resilience strategy launched in 2020. It spans over 70 measures: promoting sustainable water use, restoring wetlands, investing in green infrastructure, and integrating climate resilience into spatial planning. Initially funded with €75m, the programme has expanded and is monitored with measurable indicators (e.g. hectares of wetland restored, litres of water saved).

Relevance for Malta

Malta is one of the most water-scarce countries in Europe, relying heavily on energy-intensive desalination. The Blue Deal shows how to combine legislation, investment, and monitoring to systematically address drought and scarcity.

Implementation in Malta

Establish a National Water Resilience Deal uniting WSC, ERA, Ambjent Malta, and councils. Measures could include wetland restoration (e.g. Salina, Is-Simar), greywater reuse, and agricultural demand management. Use EU Cohesion Fund and LIFE Programme financing, with public dashboards reporting outcomes.

7.1.4 Example 4: Shelter Infrastructure and Risk Preparedness – Lithuania

Context

Lithuania has developed a Construction Technical Regulation that sets out clear, enforceable standards for shelters. It defines minimum floor space per person, structural reinforcements, air filtration systems, autonomous water and energy supplies, and accessibility requirements. Shelters must also be connected to first aid and sanitation facilities. The regulation applies not only to new public buildings but also to multi-storey residential blocks.

Relevance for Malta

Malta's WWII shelters are culturally embedded but technically outdated. The evidence tables stress the importance of dual-use hubs and civil defence preparedness. Lithuania's regulation provides a model for modernising Malta's shelter system for today's hazards (air quality, power outages, CBRNe).

Implementation in Malta

Introduce a Maltese Shelter Regulation Act defining minimum standards for upgrades and new collective protection facilities. Responsibility should be shared by CPD, Planning Authority, and local councils, with Heritage Malta engaged where shelters intersect historic sites.

7.1.5 Example 5: Data-Driven Spatial & Risk Planning – Aix-Marseille (Région SUD)

Context

Aix-Marseille has pioneered AI and satellite-based monitoring of environmental indicators like soil permeability, land artificialisation, coastal retreat, and vegetation health. These datasets inform both real-time risk tracking and long-term scenario planning, supporting adaptive policymaking.

Relevance for Malta

Malta's evidence tables call for GIS dashboards, hazard mapping, and integration of climate data into planning. Given Malta's rapid urbanisation and coastal risks, such tools are essential to avoid maladaptive development.

Implementation in Malta

Develop a National Spatial Risk Dashboard, led by ERA and MITA in partnership with the University of Malta. Integrate satellite observation, hazard maps, and AI forecasting into SPED and local plans, ensuring planners and councils can access actionable data.

7.1.6 Example 6: Cross-Sectoral Climate Governance – (Région SUD)

Context

Région SUD (France) coordinates climate, biodiversity, and spatial planning under frameworks like the Regional Climate Plan and Natura 2000 programmes. It brings together agencies (ADEME, DREAL), municipalities, and researchers, aligning land use, risk reduction, and climate adaptation. Funding is leveraged through EU programmes (CARDIMED, Horizon Europe).

Relevance for Malta

Evidence tables stress fragmented governance across ministries and agencies. PACA demonstrates how structured inter-agency frameworks can align strategies and ensure resources are efficiently used.

Implementation in Malta

Establish a National Climate & Resilience Council under OPM, integrating ERA, Planning Authority, CPD, WSC, and health bodies. Use EU project participation (e.g. Horizon Europe, Interreg Med) to connect Maltese resilience governance to European innovation.

7.1.7 Example 7: Integrated Water Management – Enschede

Context

Enschede combines traditional infrastructure upgrades (separating rainwater and wastewater) with nature-based solutions like wadis, rain gardens, green roofs, and multifunctional basins. Subsidies and community engagement make these solutions accessible. These measures reduce flood risk, support biodiversity, and improve liveability.

Relevance for Malta

Flash floods in dense urban cores are a priority in the evidence tables, alongside stormwater separation and NbS. Malta's drainage often overloads sewage, causing health and economic disruption.

Implementation in Malta

Separate stormwater and sewage systems in urban areas, prioritise permeable pavements, green roofs, and rain gardens in planning codes, and fund uptake via ERDF and LIFE subsidies. Local councils should implement measures at neighbourhood scale.

7.1.8 Example 8: Adaptation Pyramid – Enschede

Context

The Adaptation Pyramid is a layered resilience framework: 1) prioritise natural systems, 2) complement with technical measures, 3) prepare crisis response. It structures decision-making to ensure NbS are the first line of defence, not an afterthought. Enschede illustrates it through projects like the *Stadsbeek* brook restoration, which integrates drainage, groundwater retention, and public space renewal.

Relevance for Malta

Malta's responses are often reactive (e.g. drainage upgrades after floods). The pyramid provides a strategic hierarchy for making efficient use of scarce land and budgets.

Implementation in Malta

Integrate the pyramid into **SPED and local plans**. Protect wetlands and floodplains first, retrofit urban areas with NbS second, and establish crisis protocols as the third layer. Use **visual guidance** to help councils and ministries apply the model.

7.1.9 Example 9: Community Engagement & Climate Justice – Enschede

Context

The *GroenBlauw* programme supports long-term climate awareness and adaptation at the neighbourhood level. It offers incentives for green roofs, rain gardens, façade gardens, and rain barrels, while applying social vulnerability mapping to ensure resources reach exposed groups. Importantly, it is designed as a continuous programme, not a one-off campaign.

Relevance for Malta

Evidence tables emphasise equity, awareness, and local engagement. Malta's strong community networks are an asset but need systematic integration into resilience strategies.

Implementation in Malta

Launch a long-term community greening and awareness programme, offering small grants for household and neighbourhood NbS. Develop a social vulnerability index with NSO and health data to target interventions. Partner with NGOs, schools, and councils to co-create projects and ensure local ownership.

7.1.10 Example 10: Counter-Terrorism through Spatial Planning – UK (Edinburgh)

Context

UK planning integrates counter-terrorism[2] at the design stage of crowded places, reducing vulnerabilities in stadia, shopping centres, and transport hubs. Guidance emphasises natural surveillance, hostile vehicle mitigation, blast resistance, and orientation of buildings. The 2025 Terrorism (Protection of Premises) Act formalises these duties.

Relevance for Malta

The evidence tables highlight terrorism and cyber risks in crowded urban spaces. Malta's heritage-rich, narrow streets complicate physical security retrofits, but early design integration is possible.

Implementation in Malta

[2] Crowded Places: The Planning System and Counter-Terrorism

Embed security-by-design principles into planning codes, especially for redevelopments of transport hubs and urban centres. Issue heritage-sensitive guidance so safety upgrades in Valletta and Mdina respect cultural assets while strengthening resilience.

7.1.11 Example 11: Re-Start Declaration – Ukraine (Chernihiv example)

Context

The Re-Start Declaration[3] (2022) integrates climate adaptation, disaster preparedness, and conflict resilience into a single framework, recognising that risks are no longer rare or isolated. Tools include hazard mapping, evacuation routes, and logistics planning in cities under pressure. The city of Chernihiv in Ukraine provides a practical example of this principle, where spatial planning maps include designated evacuation routes and logistics flows to support both civilian safety and emergency response during conflict.

Relevance for Malta

Malta does not face conflict on this scale, but the principle of integrated risk frameworks is essential for a small state where climate, health, and geopolitical risks overlap.

Implementation in Malta

Develop a National Integrated Resilience Framework that combines hazard mapping, evacuation planning, and supply chain resilience. Focus on critical corridors (airport, Freeport, main hospital) and embed coordination under OPM.

7.1.12 Example 12: National Spatial Programme for Defence – Netherlands

Context

Rising defence spending in the Netherlands[4] required new facilities, but in a crowded country this risked public opposition. The National Spatial Programme for Defence identified sites through **transparent public consultation and environmental assessments**, balancing security needs with sustainability and democracy.

Relevance for Malta

Malta's land scarcity makes military planning highly sensitive, particularly around heritage and natural sites. The evidence tables highlight the need for civil defence upgrades and community trust.

Implementation in Malta

Create a transparent defence planning framework, using public consultation, environmental review, and early site identification. This ensures resilience investments (e.g. dual-use shelters, AFM facilities) are democratically legitimate and environmentally sustainable.

[3] RE-START - EUROPE Manifesto - ECTP-CEU

[4] Ontwerp Nationaal Programma Ruimte voor Defensie | Publicatie | Defensie.nl

8 Implementation & Monitoring Strategy

The evidence tables and recommendations for Malta highlight how **climate hazards (floods, heatwaves, droughts), geopolitical risks (cyberattacks, hybrid disruptions), and public health crises (pandemics, CBRNe)** repeatedly expose the same infrastructures, hospitals, schools, water and energy systems, and densely built urban areas. Because of Malta's **small size, high population density, and dependence on critical infrastructure**, resilience requires not only well-designed measures but also **systematic implementation, continuous monitoring, and adaptive governance**. This section sets out how Malta can operationalise its resilience strategy through coordination mechanisms, integrated monitoring, capacity-building, and innovation.

Implementation Mechanisms

To overcome fragmentation, it is recommended that Malta establishes a **National Resilience Coordination Council (NRCC)** under the Office of the Prime Minister. This body would integrate the **Civil Protection Department, Planning Authority, Water Services Corporation (WSC), Infrastructure Malta, MITA, Ministry for Health, and local councils**, including the Southern Regional Council, which has a pivotal role in connecting municipal resilience efforts to national frameworks.

Resilience implementation must focus on **dual-use infrastructure**. Schools (*social_infra_education*), hospitals (*social_infra_hospital*), and municipal halls should be upgraded with backup power, cooling, and shelter facilities. At the same time, **ecosystem buffers** — wetlands (*area_nature_zone*), urban green areas (*urban_green_area*), and Natura2000 zones — should be secured as frontline protections against flooding, heat, and biodiversity loss.

To ensure clarity, **toolkits and guidelines** should be developed on shelter retrofitting, NbS for stormwater (*fluvial_flood_score*), heat mitigation (*heat_wave_days*), and equity-first planning (*elderly_pct*, *young_pct*, *foreigners_pct*). These will provide technical standards and promote consistency across municipalities and utilities.

Monitoring & Evaluation Frameworks

A **National Resilience Dashboard**, managed by MITA, should integrate data from ministries, utilities, and local councils, making resilience measurable and anticipatory rather than reactive. Further details on these indicators can be found in Section 4, Table 1, which provides a comprehensive overview of the metrics, their definitions, and associated data source. The following examples illustrate this approach; the aim is not to present every possible combination, but rather to demonstrate how local authorities can apply these indicators to assess and strengthen their resilience.

Social indicators

- Settlement exposure – *buildings_count*, *population*, *built_area*.
- Access to services – *dist_1*, *dist_2*, *delta_dist*, *social_infra_hospital*, *social_infra_education*.
- Social vulnerability – *elderly_pct*, *young_pct*, *foreigners_pct*, *rural_urban_class*.

Environmental indicators

- Climate risks – *fluvial_flood_score*, *heat_wave_days*.
- Ecosystem health – *urban_green_area*, *area_nature_zone*, *biodiversity_intact_index*.

Technological indicators

- Critical infrastructure – *critical_energy_infra*, *infra_station*, *wastewater_treatment_plant*.
- Continuity of services – *infra_government_building*, *infra_bank*, *military_area*.

Clear **benchmarks** should be introduced, for example:

- % of schools and hospitals meeting dual-use resilience standards
- Hectares of restored or newly designated urban green areas
- Reduction in hospital inaccessibility risk (*delta_dist*)
- Number of municipalities publishing resilience progress reports at *NUTS3* level

Annual **Resilience Progress Reports**, coordinated by the NRCC, would ensure transparency, provide public accountability, and track EU compliance.

Capacity-Building and Training

Malta's resilience depends on **human capacity at national and local levels**. Training should target local councils, utilities, and NGOs in **shelter management, NbS maintenance, and crisis communication**.
Given Malta's reliance on volunteers, a **Community Resilience Registry** could be maintained by the Civil Protection Department to track trained volunteers, resources, and local leaders. Training modules should be delivered both **in person and online**, ensuring accessibility for smaller councils and community organisations.
Annual **simulation exercises** should bring together the Civil Protection Department, WSC, MITA, hospitals, and local councils to test flood, heatwave, and cyber scenarios. These exercises should be expanded to include vulnerable groups identified through *elderly_pct*, *foreigners_pct*, and *young_pct* data.

Social Innovation and Collaboration

Malta should leverage its **academic and innovation ecosystem**, such as the University of Malta and MCAST, to pilot AI-enabled flood prediction, digital water monitoring, and smart early warning systems. Collaboration with NGOs and community organisations (Nature Trust, SOS Malta) will strengthen **public trust, outreach, and community-based monitoring**.
Citizen science could supplement resilience efforts, e.g. through biodiversity monitoring (*biodiversity_intact_index*) or urban heat mapping linked to *heat_wave_days*. Embedding resilience into **planning law, building regulations, and investment approvals** — such as requiring rainwater harvesting, dual-use standards, and resilience impact assessments — would institutionalise these practices across electoral cycles.

Next Steps

Malta's resilience strategy must now move from **fragmented, reactive interventions** to a **systematic framework of implementation and monitoring**. A central coordinating body, digital dashboards, measurable indicators, and sustained training will provide the backbone. At the same time, **innovation, citizen engagement, and legislative embedding** will ensure resilience is not episodic but continuous.
By treating resilience as a **permanent governance function** — linking climate, health, and security through Build Back Better principles — Malta can not only withstand crises but also sees them as opportunities to strengthen equity, ecosystems, and public services for the long term.

9 Conclusion

Malta's small size, high density, and strategic location in the Mediterranean create both **acute vulnerabilities and unique opportunities** for building resilience. The evidence tables, synthesis, and best practices all point to the same reality: **the same infrastructures, systems, and communities are exposed across climate, geopolitical, and public health risks**. Hospitals, schools, utilities, and transport networks are repeatedly highlighted as pressure points, underscoring the urgency of addressing resilience in a systemic rather than sectoral way.

The synthesis identified **three strategic shifts** Malta must undertake:

1. **From fragmented governance to integrated national coordination**, ensuring that resilience is led from the centre of government with clear legal mandates and inter-agency mechanisms.
2. **From single-purpose to dual-use, multi-hazard infrastructure**, maximising the value of every investment in Malta's constrained territory by creating facilities that serve daily needs and emergency functions alike.
3. **From government-led response to multi-actor resilience partnerships**, embedding local councils, regional councils such as the Southern Regional Council, private utilities, NGOs, and community networks into the continuous cycle of surveillance, preparedness, and recovery.

The best practices drawn from other regions demonstrate that Malta's challenges are **not unique** — and that proven solutions exist. From **rainwater ordinances** and **integrated water management** to **climate governance frameworks** and **shelter standards**, these examples show how other regions have operationalised resilience by combining law, investment, and partnership. Adapted to Malta's context, they provide **practical pathways for implementation**.

Ultimately, resilience for Malta means more than surviving crises. It means **turning crises into opportunities to build back better**, using every shock as a chance to strengthen systems, restore ecosystems, and reinforce community trust. By embedding resilience into **laws, spatial planning, infrastructure design, and community practice**, Malta can transform its small size from a vulnerability into an advantage — enabling agility, cohesion, and forward-looking adaptation.

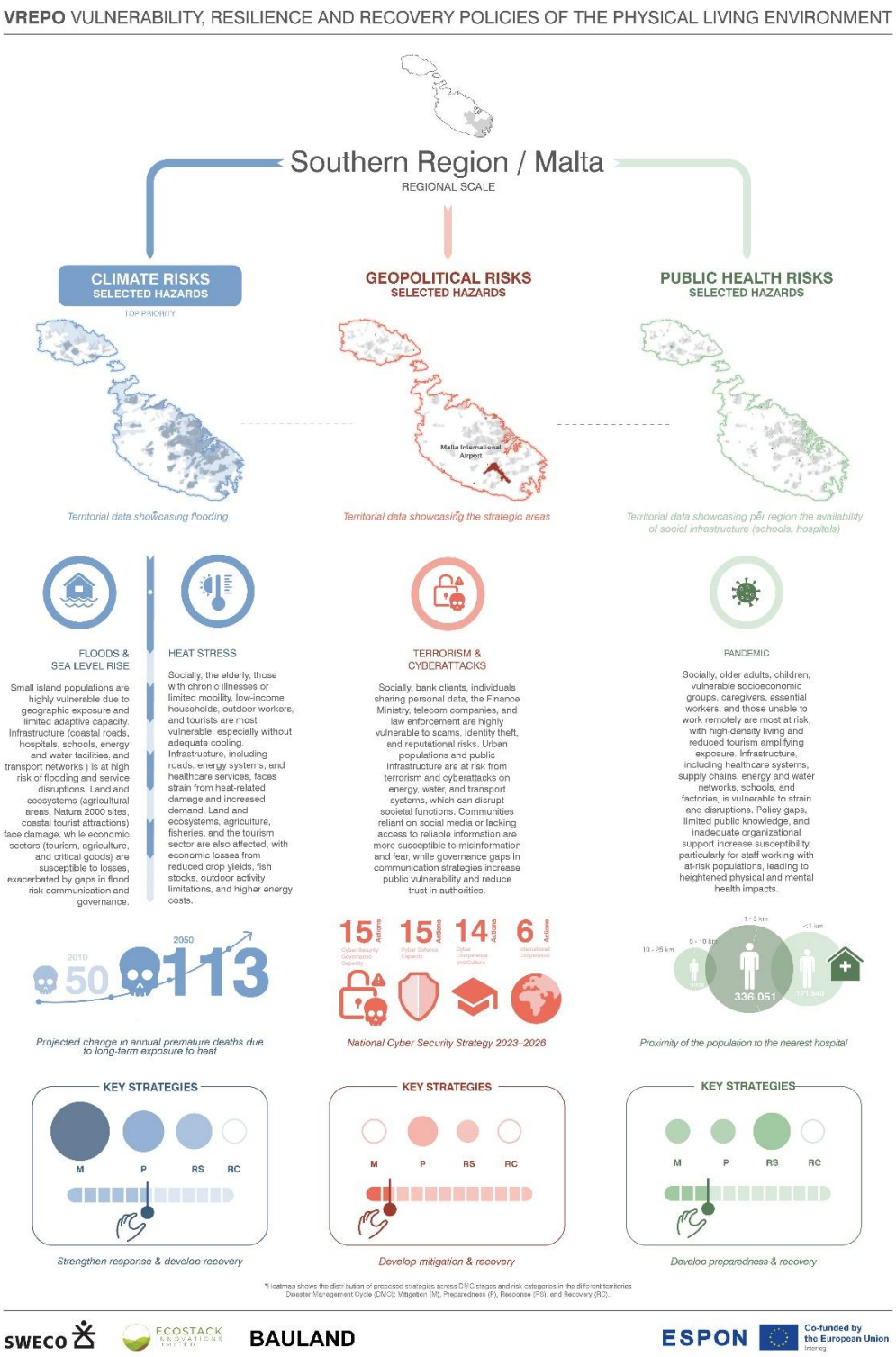
Malta's pathway to resilience is therefore clear: **integrated governance, multifunctional infrastructure, and inclusive partnerships**. By aligning these shifts with EU frameworks and financing, Malta can deliver a resilience strategy that is both **locally grounded and internationally connected**, ensuring that the island remains safe, liveable, and sustainable for generations to come.

Key Policy Takeaways

- **Build systemic resilience:** Address climate, geopolitical, and public health risks in an integrated, cross-sectoral manner across infrastructure, communities, and ecosystems.
- **Strengthen governance integration:** Move from fragmented approaches to **centralized, coordinated national resilience leadership** with clear legal mandates and inter-agency mechanisms.
- **Maximise multifunctional infrastructure:** Promote **dual-use, multi-hazard facilities** that serve daily functions and emergency needs, optimising investments in Malta's constrained territory.
- **Foster multi-actor partnerships:** Embed **local councils, private utilities, NGOs, and community networks** into continuous cycles of monitoring, preparedness, and recovery.
- **Leverage best practices:** Adapt proven solutions from other European regions—such as water management, climate governance frameworks, and shelter standards—to Malta's context.
- **Turn crises into opportunities:** Use recovery and adaptation processes to **strengthen systems, restore ecosystems, and reinforce community trust**, making resilience an active principle rather than a reactive measure.
- **Align with EU frameworks:** Ensure Malta's resilience strategy is **locally grounded, internationally connected, and sustainable**, supporting long-term safety, liveability, and adaptability.

10 Annexes

The Malta poster synthesizes the project's key findings for the region, highlighting territorial vulnerabilities, hazard exposure, and resilience strategies across climate, geopolitical, and public health risks. By linking these insights to the Policy Recommendations chapter, it provides a clear, visually engaging tool to support discussion, prioritization, and context-specific policymaking.



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