Interreg Europe

Co-funded by the European Union

CLIMATE

A1.3: EXCHANGE OF PRACTICES IN DISASTER RISK MANAGEMENT AND REACTIVE EMERGENCY MEASURES TO EXTREME WEATHER EVENTS AND CLIMATE HAZARDS

Good Practices Guide

Disclaimer:

The opinions expressed are solely those of the author(s). In no case should they be considered or construed as representing an official position of the European Commission or of the Interreg Europe monitoring committee.

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Introduction

Within the framework of CLIMATE project's activity A1.3 "Exchange of good practices in disaster risk management and reactive emergency measures to extreme weather events and climate hazards", the City of Brussels (BRUSSELS) designed an online survey to streamline project partners in documenting relevant practices. Emphasis was given in the documentation of policy measures that a) have successfully reduced disaster risks linked to extreme weather events and climate-related hazards, and/or b) have proven effective in safeguarding human lives, ecosystems, and critical infrastructure during emergencies caused by such events.

For the purposes of the survey, partners were requested to focus on three areas of Disaster Risk Management: i) Risk reduction policy measures, ii) Preparedness measures and iii) Emergency response measures.

Moreover, partners' focus, aligned with the context of the Thematic Background of the Research Guidelines, should be placed on:

- Localised small-scale interventions to reduce risks in specific contexts (e.g., safety nets, flood markers, drainage systems, etc.).
- Urban development policies to reduce risks across broader contexts (e.g., land-use planning, building standards, peri-urban roadside drainage networks, etc.)
- Emergency plans and early warning systems to enhance the operational preparedness of regional authorities.
- Awareness-raising and educational initiatives to improve public preparedness.
- Immediate emergency response measures following an event or hazard (e.g., arranging accommodation, medical supply, etc.)

The good practices submitted by partners were forwarded to Vas County Government Office (VVOH), for further consideration and analysis. The present document presents the practices submitted by the partners in a comprehensive way along with a comparative discussion of their assessment based on the criteria outlined in the Research Guidelines authored by BRUSSELS. To conclude, based on the classification of the submitted good practices, VVOH discusses in further detail those practices that were classified as "Best" or "Promising" while also providing the consortium with widely applicable policy recommendations building on the identified best and promising practices for improved climate hazard preparedness and management in the CLIMATE territories.

Overview of Collected Data

Partners, including the discovery partner from Albania, SARANDA, were **required to submit two to three good practices, classified under at least two different categories** (i.e., risk reduction measures, preparedness measures, and emergency response measures). The goal was to collect a total of 20 to 30 practices to ensure there were enough examples in each main category for the subsequent comparative analysis of their effectiveness and potential for transferability.

Ideally, the practices submitted by partners should **originate from their own country**, preferably from their own region. However, if partners could not identify practices at the national level, they were advised to select practices from outside the partnership countries, thus avoiding duplicate submissions from multiple partners.

Overall, the **submission targets were achieved**, with the exception of SARANDA that submitted just one practice (Table 1).

Table 1: Submission Overview

Partner	Good Practices Submitted
University of Patras, Greece	2
Helsinki Region Environmental Services Authority, Finland	2
City of Brussels, Belgium	4
Lombardy Foundation for the Environment, Italy	2
Province of Drenthe, Netherlands	3
Vidzeme Planning Region, Latvia	3
Stara Zagora Municipality, Bulgaria	2
Region of Ionian Islands, Greece	3
Vas County Government Office, Hungary	5
Saranda Municipality, Albania	1
Total	**27**

However, **two of the submitted practices do not fall within the scope of the activity** as they concern recovery measures and as stated in the Research Guidelines page 5 *"The elements of risk assessment and recovery fall outside the scope of Activity A1.3 […]"*. These practices are:

- "Restoration of fire devastated forest area near Stara Zagora through large public participation" by the Stara Zagora Municipality
- "Identifying key logistic hubs and partners for a fast recovery" by the City of Brussels

In addition, **two other submitted practices did not focus on climate-related extreme events or hazards** and were not considered in the analysis:

- "Operational Information Centre in Valmiera County" by the Vidzeme Planning Region
- "Anti-seismic shielding" by the Region of Ionian Islands

To conclude, the analysis and **discussions that follow concern 23 good practices**. Of these remaining practices within the scope of the activity, most concern preparedness measures or risk reduction measures, and three are about emergency response measures.

Disaster Risk Management Component	Good Practices Submitted
Emergency Response	3
Risk Reduction	10
Preparedness	10

Review of Assessment Criteria

The submitted good practices were each assessed by the submitting partner, applying five criteria:

- **Relevance:** The degree to which the measure/practice is tailored to address specific climate risks, vulnerabilities, or challenges posed by extreme weather events.
- **Impact:** The extent to which the measure/practice has successfully mitigated risks, reduced harm, or enhanced climate resilience locally, regionally, or nationally – depending on the context.
- **Sustainability:** The ability of the measure/practice to remain relevant and effective over time, while also continuing to meet the needs of the affected population.
- **Cost-effectiveness:** The institutional and financial efficiency of the measure/practice to achieve intended outcomes (i.e., meaningful risk reduction or emergency response), considering the use of resources relative to the scale and scope of the benefits delivered.
- **Transferability potential:** The extent to which a successful policy practice can be reproduced by another region or country.

Each criterion was evaluated in a 5-point scale, from 0 to 4, where 0 represents a practice that does not meet the criterion in concern, while 4 represents a practice that fully meets the criterion in concern.

Table 2: Activity A1-3 Good Practices' evaluation scale

Grade	Extent to which the policy element meets the criterion
0	Not at all
1	Slightly
2	Moderately
3	Much
4	Fully

The classification of the submitted policy measures/practices was based on the aggregated score from each of the criteria, as explained in Table 3.

Table 3: Activity A1-3 Good Practices' Classification

Classification	Description	Score obtained
Best	A policy element that can facilitate policy transfer, driving effective policymaking. It has proven to be successful in reducing disaster risk or addressing emergencies due to extreme weather events, while also utilising an approach	**≥ 15**

Classification	Description	Score obtained
	that is sustainable, cost-effective, and transferable to other regions and/or contexts.	
Promising	A policy element that has produced some tangible results regarding the reduction of disaster risk or the response to emergencies due to extreme weather events in a given geographical scope. It utilises an approach that has the potential to be transferred to other regions and/or countries in a cost-effective and sustainable way.	**13 - 15**
Poor	A policy element that has not proved to either be sufficiently successful in reducing disaster risk or responding to emergencies due to extreme weather events or has utilised an approach that is not sustainable or cost efficient. It is not transferable to other regions and/or countries.	**< 13**

Submitted Practices

DARDANOS 2 – National Emergency Response Plan for Flood Risk in Greece			
Country:	Greece	**Submitted by:**	UPAT
Disaster Risk Management Component concerned:	emergency response		
Climate risk(s) addressed:	extreme precipitation, floods		
Implementation level:	national		
Links(s) to source(s):	https://civilprotection.gov.gr/		

Stakeholders involved:

General Secretariat for Civil Protection (GSCP), Regional and Municipal Civil Protection Authorities, Fire Service and Hellenic Police

Approach:

DARDANOS 2 is a multi-level national plan activated in response to extreme hydrometeorological events. It standardizes procedures across municipalities and regions, establishing clear roles and protocols for emergency activation, inter-agency coordination, and resource mobilization.

The plan includes:

(i) Technical pre-checks (e.g., storm drain cleaning, critical infrastructure inspection)
(ii) Deployment of emergency crews and equipment
(iii) Continuous weather monitoring and early warnings
(iv) Real-time coordination via Local and Regional Civil Protection Coordination Centres
(v) Community alerts and evacuation guidance

Evaluation

Relevance:	4	Impact:	4
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	4	**Final Score**	**18**

Forest Protection Plan – ANTINERO III			
Country:	Greece	**Submitted by:**	UPAT
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	wildfires, floods		
Implementation level:	national		
Links(s) to source(s):	https://greece20.gov.gr/ https://observatory.sustainablegreece.com/ https://www.oecd.org/		

Stakeholders involved:

General Directorate of Forests and Forest, Ministry of Environment and Energy, Recovery and Resilience Facility, Hellenic Republic Asset Development Fund

Approach:

Key components of ANTINERO-III pertaining to flood risk reduction:

(i) "Pilot Program for the Creation of Firebreaks in the Region of Ilia" – Establishment of mixed firebreak zones (i.e., buffer zones) to impede wildfire spread and facilitate access to the forest in the event of a (wild)fire.

(ii) The "Firebreak Creation Program" – Scaling the pilot establishment and maintenance of firebreak zones of pure or mixed vegetation with broadleaf species (slower and more controlled fire spread) through enrichment planting, with an emphasis on forests or forest areas located near or mixed with residential areas.

(iii) "Other fire protection works" - Forestry works to be implemented in 2024 and 2025 to protect forest ecosystems throughout the country, forest clearing, maintenance of forest road network, maintenance of firebreak zones.

Evaluation

Relevance:	4	Impact:	2
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	4	**Final Score**	**16**

Hungarian Drought Index (HDI)

Country:	Hungary	**Submitted by:**	VVOH
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	drought		
Implementation level:	national		
Links(s) to source(s):	https://aszalymonitoring.vizugy.hu/ https://hidrologia.hu/		

Stakeholders involved:

Regional water management directorates

Approach:

In 2021, the Water Management Act redefined “water damage” as “damage resulting from water surplus and water scarcity.” To declare the different levels of drought alert, it was necessary to develop a drought classification system based on quantifiable (threshold) values, which later serves to justify the necessity of interventions.

As European drought/water scarcity forecasts were not adaptable, Hungary developed its own national system, the Hungarian Drought Index (HDI). The legislation defines the drought alert levels for water management (defence) authorities based on the specific threshold values of this index.

The HDI offers nationwide coverage and is updated daily via the Operational Drought Assessment and Forecasting System. Its key advantages include minimal input requirements (daily precipitation and mean temperature) and a modular, algorithmically modified structure.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	2	**Final Score**	**15**

"Water into the Landscape" national programme			
Country:	Hungary	**Submitted by:**	VVOH
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	drought, floods		
Implementation level:	national		
Links(s) to source(s):	https://www.ovf.hu/ https://terkeptar.vizugy.hu/		

Stakeholders involved:

General Water Management Directorate, farmers, agricultural support organisations (e.g. Chambers of Agriculture)

Approach:

The water management sector strives to fill inland water reservoirs. Water retention can primarily be implemented on areas managed by water authorities, as no compensation needs to be paid for potential agricultural damages there. During significant inland water events, areas designated in inland water defence plans that are privately owned may also be flooded; in such cases, farmers are obliged to tolerate the flooding, but they are entitled to claim compensation. For this reason, water management professionals have been least inclined to use this option so far. Consecutive years of drought have brought about a shift in the mindset of farmers, who now require sufficient soil moisture to sustain production, and they have realised that they must also offer their lands for inundation. These two needs have now converged, and alongside national regulations, the General Water Management Directorate created a new online platform to receive applications from farmers who wish to retain water on their lands.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**15**

Youth Awareness Through Community Service in Disaster Management

Country:	Hungary	**Submitted by:**	VVOH
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	Floods		
Implementation level:	national		
Links(s) to source(s):	https://www.katasztrofavedelem.hu/		

Stakeholders involved:

Vas County Disaster Management Directorate, Schools, Educational Authority

Approach:

Under the current national public education law, secondary school students are required to complete fifty hours of community service in order to qualify for their final exams. One alternative for fulfilling this requirement is through participation at the disaster management authority.

This engagement offers students first-hand exposure to the responsibilities and operations of the organisation, fostering a deeper understanding of safety, preparedness, and civic duty. It cultivates a sense of responsibility and commitment to disaster prevention and protection, encouraging students to take an active role in safeguarding themselves and their communities.

Students may contribute to a range of activities, including:

(i) Prevention and preparedness efforts, such as organising school fire drills and leading awareness campaigns.

(ii) Support during major emergencies, by assisting with logistical and background tasks that aid response operations.

Evaluation

Relevance:	4	Impact:	2
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**16**

Extreme Weather Catalogue (EWC)

Country:	Hungary	**Submitted by:**	VVOH
Disaster Risk Management Component concerned:	Preparedness		
Climate risk(s) addressed:	extreme weather events		
Implementation level:	national		
Links(s) to source(s):	https://localience.eu/		

Stakeholders involved:

Vas County Disaster Management Directorate and its partners in Interreg Central Europe LOCALIENCE project

Approach:

The Extreme Weather Catalogue (EWC) was developed within the framework of the Interreg Central Europe LOCALIENCE project. The EWC is a catalogue of extreme weather events typically occurring in the project regions, along with the related measures and resources for their management. Thus, it represents a combination of extreme weather events and the locally applicable measures, capacities, and resources, enabling criterion-specific and correlation analyses. The catalogue is recorded and maintained by the project partners.

To comply with the project requirements, the EWC was developed in an online, web-based format. The data stored in the EWC can be divided into two main groups. The first group includes basic data, such as the physical geographical, climatic, and settlement structure characteristics of the affected areas. The second group contains data on meteorological events and disaster management interventions.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	2	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**14**

Flooding forecast model

Country:	Hungary	**Submitted by:**	VVOH
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	floods		
Implementation level:	national		
Links(s) to source(s):	https://www.interreg-athu.eu/raabflood4cast/		

Stakeholders involved:

Cross-border water/disaster management organisations, those responsible for flood protection (e.g. mayors), actors developing databases and models

Approach:

In 2011, Austrian and Hungarian experts collaboratively developed a cross-border flood warning and forecasting model for the entire Rába catchment area. This system calculates water levels and load values at designated forecast points up to six days in advance, providing early and actionable insights.

Given that local flood defence falls under the responsibility of mayors, the model serves as a vital decision-support tool. Between 2018 and 2022, under the Raab Flood 4cast project (Interreg V-A Austria–Hungary Programme), the original model was significantly enhanced. It was complemented with two-dimensional inundation forecasts and detailed flood inundation maps, offering a more precise and visual understanding of potential flood scenarios.

The project's core objective was to create a unified visualisation and warning tool capable of displaying anticipated inundation zones. It also facilitated joint cross-border flood and disaster management exercises, strengthening cooperation and preparedness across regions.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	2	Cost-effectiveness:	4
Transferability potential:	2	**Final Score**	**15**

Flood Experts Working Group			
Country:	Belgium	**Submitted by:**	BRUSSELS
Disaster Risk Management Component concerned:	emergency response		
Climate risk(s) addressed:	floods		
Implementation level:	local		
Links(s) to source(s):	--		

Stakeholders involved:

Brussels City, Brussels Regional Administration, Vivaqua, Hydria, Brussels Port, emergency services

Approach:

To make the decision process for flood management faster and more precise, Brussels region has set up an expert group on floods. It is available at all times to offer help and expertise. In the case of Brussels, the group includes city and regional emergency planers, waterway managers, the Brussels Port (in charge of the canal), Vivaqua and Hydria (private water treatment and sewer maintenance companies), flood modelling experts and civil protection experts. This panel can exchange via a privet online group chat and define a common well-informed approach to each specific risk situation. Their evaluation is an integral part of the early warning system and can make the difference between activating the emergency plan or not.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	3	Cost-effectiveness:	4
Transferability potential:	3	**Final Score**	**16**

Fresh Network Map

Country:	Belgium	**Submitted by:**	BRUSSELS
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	heatwaves		
Implementation level:	local		
Links(s) to source(s):	--		

Stakeholders involved:

Brussels City, Vulnerable inhabitants

Approach:

To support citizens most vulnerable to extreme heat, whether at work or at home, it's essential to offer accessible cool zones throughout the city's public spaces. Brussels addresses this need through its innovative Fresh Network Map, a user-friendly tool that helps residents locate nearby refreshment spots.

The map allows citizens to easily find the fresh spots near them, including parks, swimming pools, churches, climatised public buildings, shopping centres, etc. The map also shows free water fountains, and spots where citizens can refill their water bottles.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	4	**Final Score**	**17**

Nature-based solutions (NbS) for local infiltration

Country:	Belgium	**Submitted by:**	BRUSSELS
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	floods		
Implementation level:	local		
Links(s) to source(s):	https://www.bruxelles.be/plan-climat-eau		

Stakeholders involved:

Brussels City, Brussels Regional Administration, major building owner, building sector, private citizens

Approach:

The city of Brussels is taking decisive action to address urban flood risks, particularly in light of changing climate patterns and increasingly intense rainfall. Situated across several river basins, Brussels understands the hydrological link between rain falling on elevated terrain and the potential for flooding in lower-lying valleys.

To mitigate this risk, the city is prioritising projects that reduce the volume of rainwater entering the sewer network, promoting nature-based solutions (NbS) that encourage local infiltration, and allow water to be absorbed into the ground rather than channelled into drainage systems.

These initiatives are being implemented at multiple scales:

(i) Encouraging homeowners to disconnect roof drains from the sewer system.
(ii) The Roi Baudouin football stadium in Laeken is being disconnected to reduce runoff.
(iii) Introducing permeable surfaces and green infrastructure in public spaces to manage stormwater naturally.

Brussels supports these efforts through financial grants, technical guidance, and direct interventions in flood-prone neighbourhoods. The city's commitment reflects a broader strategy to build resilience, protect vulnerable communities, and integrate sustainable water management into urban planning.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	4	**Final Score**	**17**

"IOLAOS" General Plan for Responding to Emergencies caused by Forest Fires			
Country:	Greece	**Submitted by:**	RII
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	wildfires		
Implementation level:	national		
Links(s) to source(s):	https://civilprotection.gov.gr/ https://www.youtube.com/video1 https://www.youtube.com/video2 https://www.youtube.com/video3 https://civilprotection.gov.gr/odigies-prostasias https://hazardspro.eu/		

Stakeholders involved:

Regional Authorities, Municipalities, Decentralized Administrations of the country, Ministry of Environment and Energy

Approach:

The General Plan for Responding to Emergencies Caused by Forest Fires, known as "IOLAOS", provides a comprehensive framework for managing wildfire risks across Greece. The plan is implemented through region-specific action plans, developed by local units. Each local plan includes four key components:

(i) Preparatory actions
(ii) Enhanced preparedness measures
(iii) Operational support for the Fire Department
(iv) Immediate relief and recovery actions

A critical tool in daily operations is the Forest Fire Risk Forecast Map, which identifies areas at high risk of wildfire within the next 24 hours. In response to elevated risk levels, authorities enforce temporary bans on movement and access in vulnerable zones, including:

(i) NATURA 2000 protected areas
(ii) Forest ecosystems
(iii) Parks and groves

Evaluation

Relevance:	4	Impact:	4
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**18**

Emergency Response to Extreme Weather Events

Country:	Greece	**Submitted by:**	RII
Disaster Risk Management Component concerned:	emergency response		
Climate risk(s) addressed:	wildfires		
Implementation level:	national		
Links(s) to source(s):	https://civilprotection.gov.gr		

Stakeholders involved:

Ministry of Climate Crisis and Civil Protection, relevant ministries, Region of the Ionian Islands.

Approach:

The Regional Civil Protection Coordination Body (PESOPP) is convened in emergency situations to oversee and coordinate the actions of all relevant agencies and services at the regional level. This body ensures a unified and efficient response to emerging risks and disasters.

- Early Warning System: Greece uses the 112 emergency alert system to immediately inform the public in the event of a forest fire or when a preventive evacuation is recommended. This system plays a critical role in safeguarding lives by delivering timely and location-specific alerts.
- Digital Platform for Temporary Accommodation: To support individuals displaced by disasters, the Hellenic Chamber of Hotels has developed a digital platform that facilitates the rapid and organized accommodation of affected citizens. Key features of the platform include:
  (i) Real-time data collection on available accommodations and temporary shelter locations.
  (ii) Request management by relevant services (e.g., Regional Tourism Services), who match affected individuals with suitable lodging.
  (iii) Streamlined communication and coordination among stakeholders, including hotels, public services, and citizens, to ensure smooth transfers and effective support.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**16**

Shared stormwater data for urban planning

Country:	Finland	**Submitted by:**	HSY
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	heavy precipitation		
Implementation level:	regional		
Links(s) to source(s):	https://julkaisu.hsy.fi/		

Stakeholders involved:

City planners (urban planning, construction, and maintenance) from cities of Helsinki, Espoo, Vantaa, and Kauniainen

Approach:

This browser-based map service is designed to strengthen the role of stormwater-related GIS data in urban planning. Its core objective is to enhance stormwater management across the built environment, ensuring that the increasing rainfall linked to climate change does not endanger residents, property, businesses, or infrastructure.

By leveraging a shared information system, the service ensures that all critical stormwater data is readily available for land use planning. This approach helps eliminate data fragmentation and ensures that no valuable information is overlooked during decision-making processes.

The most significant long-term benefit is the seamless integration of stormwater management into urban planning, enabling cities to build greater resilience against climate-driven weather extremes.

Stormwater data is provided in a comprehensive and accessible format, delivered as geospatial information tailored for city planners. The SeutuRuutu map interface, managed by HSY (Helsinki Region Environmental Services Authority), serves as the central access point for this data, supporting informed planning and sustainable urban development.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**17**

Stormwater management communications material

Country:	Finland	**Submitted by:**	HSY
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	heavy precipitation		
Implementation level:	regional		
Links(s) to source(s):	https://www.hsy.fi/		

Stakeholders involved:

HSY, cities of Helsinki, Espoo, Vantaa and Kauniainen, local property owners / occupiers and property managers

Approach:

The Helsinki Region Environmental Services Authority (HSY) manages the main stormwater sewer network in the Helsinki Metropolitan Area, while property owners are responsible for stormwater on their lots. Municipalities handle stormwater in public areas, making responsibilities fragmented.

HSY has created a comprehensive, publicly available communication package to raise awareness among property owners about their responsibilities and options. The materials aim to improve preparedness and ensure that stormwater is directed to proper systems in a controlled manner, thus reducing flood risk. They include information on climate change impacts, nature-based solutions, and flood prevention. The content – texts, videos, and infographics – is available in three languages on a dedicated website. Local cities link to the materials, and dissemination includes e.g. social media influencer collaborations and a travelling exhibition in regional libraries.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	3	Cost-effectiveness:	4
Transferability potential:	4	**Final Score**	**18**

Emergency Plan of Action (EPoA) Albania			
Country:	Albania	**Submitted by:**	SARANDA
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	floods		
Implementation level:	national		
Links(s) to source(s):	www.ifrc.com		

Stakeholders involved:

Red Cross Red Crescent Movement, Directory for Civil Emergency, Prefectures/Municipalities

Approach:

The Albanian Red Cross employed a multi-layered strategy to address disaster risks. Technical interventions included the distribution of relief items—blankets, food, water, and hygiene kits—to affected families, along with monitoring and preliminary assessments. Capacity-building efforts focused on mobilising 300 trained volunteers and conducting awareness campaigns in schools and communities about flood risks and prevention. Social media was used to disseminate safety messages. Policy-level engagement was seen through Red Cross participation in emergency management commission meetings. Coordination with local authorities ensured effective resource deployment. Scenario planning guided the response efforts, while procurement systems ensured the replenishment of stocks through tenders.

Evaluation

Relevance:	2	Impact:	4
Sustainability:	3	Cost-effectiveness:	2
Transferability potential:	3	**Final Score**	**14**

Ootmaanlanden en Koningsschut climate buffer

Country:	Netherlands	**Submitted by:**	DRENTHE
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	floods		
Implementation level:	regional		
Links(s) to source(s):	https://zuidwest.drenthe.nl/		

Stakeholders involved:

Waterboard Drents Overijsselse Delta, Province of Drenthe, Municipality Westerveld, Natuurmonumenten, Staatsbosbeheer, het Drentse Landschap

Approach:

As part of the broader Natural Countryside Program, the development of Ootmaanlanden and Koningsschut has introduced innovative water management solutions to help protect the municipality of Meppel, which lies downstream in a low-lying area vulnerable to flooding. Due to climate change, the region is experiencing more extreme fluctuations in precipitation—both peaks and troughs. To address this, it was determined that 400,000 m³ of water from the Oude Vaart canal must be temporarily stored in a designated climate buffer. This buffer has now been implemented in both Ootmaanlanden and Koningsschut. In addition to flood protection, raising the water level in the area helps prevent desiccation of the Holtingerveld during dry periods, supporting ecological balance.

A range of measures has been carried out to support this dual-purpose system:

(i) Construction of quays, averaging 70 cm in height, to retain water during high levels.
(ii) Modification of existing waterways, including deepening, shallowing, widening, and selective filling.
(iii) Installation of hydraulic structures, such as a water inlet, fish ladder, and weir, to regulate water flow.
(iv) Restoration of alder groves, enhancing biodiversity and natural water retention.
(v) Creation of ponds, contributing to ecological richness and water storage.
(vi) Construction of a fish passage in Koningsschut, enabling fish migration into the Oude Vaart canal.

Evaluation

Relevance:	4	Impact:	4
Sustainability:	3	Cost-effectiveness:	4
Transferability potential:	2	**Final Score**	**17**

Heat Action Day

Country:	Netherlands	**Submitted by:**	DRENTHE
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	heatwaves		
Implementation level:	national		
Links(s) to source(s):	https://klimaatadaptatienederland.nl/; https://ggdleefomgeving.nl/; https://klimaatverbond.nl/		

Stakeholders involved:

Province of Drenthe, GGD Drenthe, Klimaatverbond Nederland

Approach:

To raise awareness about the effects of heat, the province leveraged the national Heat Action Day as an opportunity to educate staff on the growing risks associated with rising temperatures. The strategy combined informative content with tangible, real-world demonstrations to engage colleagues on multiple levels.

An informational lunch session was organised, during which provincial employees were briefed on the health impacts of heat. The session included practical examples to help participants recognise signs of heat stress, understand contributing stress factors, and identify vulnerable populations more at risk during extreme heat events.

In addition to the educational session, a hands-on demonstration was conducted to illustrate the environmental effects of heat. Using thermal imaging cameras, staff were invited to observe temperature variations around the building's exterior. This exercise revealed the significant cooling effect of green spaces and highlighted how different pavement colours influence surface temperatures.

Evaluation

Relevance:	2	Impact:	1
Sustainability:	2	Cost-effectiveness:	2
Transferability potential:	3	**Final Score**	**10**

Natural climate buffer 'de Onlanden'

Country:	Netherlands	**Submitted by:**	DRENTHE
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	floods		
Implementation level:	regional		
Links(s) to source(s):	https://klimaatadaptatienederland.nl/ https://cuatro.simcdn.nl/		

Stakeholders involved:

Province of Drenthe, municipalities Noorderveld and Tynaarlo, Waterboard Noorderzijlvest, Natuurmonumenten, Staatsbosbeheer, Drents Landschap

Approach:

In 2012, a former agricultural land was converted into a nature reserve designed to serve a dual purpose: ecological restoration and water buffering. The area is carefully structured into zones with varying inundation levels, allowing for controlled, stepwise flooding during periods of high water.

Technical interventions, such as the construction of dams, enable sections of the reserve to be temporarily sealed off, retaining water as needed to mitigate downstream flooding. The landscape's diverse elevation ensures that wildlife can safely relocate to higher ground during inundation events, supporting both habitat resilience and biodiversity.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	3	Cost-effectiveness:	4
Transferability potential:	2	**Final Score**	**16**

Cleaning of Lake Vidusezers in Smiltene

Country:	Latvia	**Submitted by:**	VIDZEME
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	floods		
Implementation level:	local		
Links(s) to source(s):	https://www.smiltenesnovads.lv/		

Stakeholders involved:

Smiltene County Municipality, EU LIFE project “LIFE Adaptate”

Approach:

The condition of Lake Vidusezers plays a crucial role in regulating the water flow of the Abuls River throughout the city. Over time, the lake had suffered from eutrophication, becoming increasingly shallow, and its floodgate had ceased to function effectively.

As part of the EU LIFE project “LIFE Adaptate,” a comprehensive restoration effort was undertaken. To minimise ecological disruption, the lake was cleaned using a sludge pumping technique that preserved aquatic life. During this process, deeper zones were carved into the lakebed to provide refuge for fish in case of temporary water level reductions during the reconstruction of hydraulic infrastructure.

The outdated floodgate was replaced with an automated lifting mechanism, allowing for precise control of water levels and improved flow management.

The extracted sludge was stored in geosynthetic bags, which now serve a dual purpose: reinforcing the riverbanks and contributing to landscape enhancement. Once dewatered, the bags were covered with soil, forming a newly landscaped shoreline that supports both ecological and aesthetic functions.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	2	**Final Score**	**15**

Digital Twin of the River Ogre

Country:	Latvia	**Submitted by:**	VIDZEME
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	floods		
Implementation level:	local		
Links(s) to source(s):	https://www.ogresnovads.lv/		

Stakeholders involved:

Ogre County Municipality, Riga Technical University, Interreg Baltic Sea Region programme project NOAH

Approach:

Within the framework of Interreg Baltic Sea Region Programme project NOAH, Ogre County Municipality in cooperation with researchers from Riga Technical University Water Systems and Biotechnology Institute established a smart wastewater drainage system management tool — a digital 3D map, covering 20 km of the Ogre River, including Ogre City. The interactive map – river's digital twin – allows to monitor changes in the water level, using several measurement stations and tools that are set along the river, as well as video cameras. Real-time data is collected, processed, and modelled to get 24-hour predictions of potential changes in water levels. As soon as the level is predicted to reach a critical point, the monitoring system sends out a warning to the responsible authorities to take the necessary civil protection measures, inform the inhabitants of the affected areas.

Evaluation

Relevance:	4	Impact:	3
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**16**

Green Solutions for Inter-Block Space in Zheleznik District

Country:	Bulgaria	**Submitted by:**	STARA ZAGORA
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	urban heat island effect		
Implementation level:	local		
Links(s) to source(s):	https://www.youtube.com/		

Stakeholders involved:

Stara Zagora Municipality, EEA Grants Program 2014-2021, local contractors and landscape architects, residents of Zheleznik neighborhood

Approach:

The pilot project Green Solutions for Inter-Block Space in Zheleznik District was implemented in 2023-2024.It focused on transforming a typical heavy concrete inter-block space into a green, multifunctional area that would help mitigate the Urban Heat Island effect and serve the local community. Asphalt surfaces were replaced with a permeable gridded paving system incorporating grass joints to allow rainwater infiltration and reduce heat retention. Shaded leisure areas were created, with walking paths made of materials designed to minimize heat absorption. Alongside the aesthetics improvement, a special vegetation for shading and thermal regulation was planted. A small-scale rainwater harvesting and irrigation system was installed to collect, filter and store rainwater in use of the greenery maintenance. The park lighting was upgraded with solar-powered, energy-efficient LED fixtures to reduce energy consumption. In addition, a public use solar charging station for mobile devices was installed.

Evaluation

Relevance:	3	Impact:	3
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	3	**Final Score**	**15**

Pilot interventions for Adaptation to Climate Change in Milan			
Country:	Italy	**Submitted by:**	FLA
Disaster Risk Management Component concerned:	risk reduction		
Climate risk(s) addressed:	drought		
Implementation level:	local		
Links(s) to source(s):	https://www.comune.milano.it/ https://www.mase.gov.it/ https://delibere.comune.milano.it/		

Stakeholders involved:

Municipality of Milan, Lombardy Region (also APA of CLIMATE) Ministry of the Environment and Energy Security (MASE)

Approach:

This initiative employs a multi-level technical and governance strategy to mitigate hydro-climatic risks through sustainable water management and infrastructure improvements.

(i) Reclamation and reuse of treated wastewater: Approximately 150 litres per second of treated water, previously discharged into the non-irrigation Redefossi canal, is now redirected for agricultural use, enhancing resource efficiency.

(ii) Irrigation network upgrade: Strategic modifications to the Macconago and Bosco/Collegato channels have shortened conveyance distances, improving hydraulic performance and reducing infiltration losses.

(iii) Channel waterproofing: A key section of the Roggia Vettabbia Alta was reinforced with geotextiles and erosion control mats, significantly minimising seepage and enhancing flow regulation.

(iv) Gravity-fed water delivery system: Treated effluent is now delivered through the network without the need for pumping, eliminating reliance on energy-intensive infrastructure and promoting low-impact water distribution.

(v) Environmental and landscape integration: The intervention was carried out with full respect for the surrounding environment, including the reuse of excavated soil and the preservation of the canal system's visual character, ensuring both ecological and aesthetic harmony.

Evaluation

Relevance:	4	Impact:	4
Sustainability:	4	Cost-effectiveness:	3
Transferability potential:	4	**Final Score**	**19**

La Brianza Cambia Clima

Country:	Italy	**Submitted by:**	FLA
Disaster Risk Management Component concerned:	preparedness		
Climate risk(s) addressed:	heatwaves, floods		
Implementation level:	local		
Links(s) to source(s):	https://labrianzacambiaclima.it/ https://www.ambienteitalia.it/ https://masteradapt.eu/		

Stakeholders involved:

Fondazione Lombardia per l'Ambiente (FLA) InnovA21 Agency Municipalities: Cesano Maderno, Meda, Bovisio Masciago, Varedo, Barlassina, Seveso, Lentat

Approach:

The initiative facilitated the co-design and implementation of a Climate Transition Strategy (CTS) for the Brianza Ovest area, uniting seven municipalities under a shared governance and planning framework. A permanent multi-level governance body, the Cabina di Regia, was established to provide strategic direction, ensure coordination, and uphold accountability across all participating entities.

The CTS integrates spatial planning, climate adaptation, and public engagement, anchored by four thematic pillars:

(i) Sustainable land-use policies: Promoting compact development, ecological zoning, and reduced soil consumption.
(ii) Nature-based Solutions: Implementing permeable surfaces, green corridors, and urban greening to enhance resilience and biodiversity.
(iii) Climate risk mapping: Identifying vulnerable zones and prioritising interventions based on hydro-climatic exposure.
(iv) Greenhouse gas mitigation: Advancing low-emission mobility, energy efficiency, and renewable energy adoption.

A robust participatory process, including stakeholder mapping, citizen engagement, and co-planning workshops, ensured local ownership and contextual relevance. To secure long-term impact, the project also embedded communication strategies and fundraising mechanisms to sustain momentum and scale future actions.

Evaluation

Relevance:	4	Impact:	4
Sustainability:	3	Cost-effectiveness:	3
Transferability potential:	4	**Final Score**	**18**

Comparative Discussion of Submitted Practices

Half of the submitted practices (12 out of 24) directly target flood-related risks, highlighting the widespread **vulnerability to flooding across CLIMATE consortium regions**, including both Mediterranean countries like Greece and Albania, and more temperate Central European areas such as the Netherlands and Belgium. Other significant climate risks addressed by the submitted practices include droughts, heatwaves, and wildfires. Notably, HSY submitted two practices that focus on stormwater management, also a critical component of flood mitigation in urban contexts. Similarly, the urban heat island effect addressed by Bulgaria's initiative submitted by STARA ZAGORA is closely linked to rising temperatures and urban heatwaves, underscoring the interconnected nature of climate risks.

Across the submitted practices (regardless of their assessment status), several common features emerge and contribute to their success and impact. Firstly, **nature-based solutions are widely adopted**, ranging from climate buffers in the Netherlands to forest cleaning and enrichment planting in Greece. These practices highlight the value of sustainable, ecologically low-impact interventions, particularly in risk reduction efforts such as Milan's adaptation program, which integrates infrastructure upgrades with ecological restoration.

Digital innovation also plays a pivotal role in enhancing Disaster Risk Management (DRM) across consortium territories. Smart systems and digital twins, like those used in Greece's DARDANOS flood response plan and Latvia's River Ogre flood prediction system, support capacity building and improve readiness before hazards strike. The use of meteorological data and geospatial tools is especially critical for forecasting and preparedness in relation to floods, droughts, and wildfires.

In terms of assessment, **21 of the 24 practices (88%) received a total score of 15 or higher**, indicating strong performance across relevance, impact, sustainability, cost-effectiveness, and transferability. Two additional practices were classified as "promising," scoring between 13 and 15 points. Only one practice — Heat Action Day in the Netherlands — was assessed as "poor," with below-average scores across all five criteria.

Among the highest-rated practices, nature-based solutions as previously noted are often a core component. **Milan's climate adaptation program, which scored 19 points, stands out as the best practice overall.** Infrastructure improvement, particularly when integrated with green infrastructure, is another recurring theme among top-rated initiatives, including Belgium's local water infiltration and flood basins (17 points) and the Netherlands' Ootmaanlanden en Koningsschut climate buffer (17 points).

From a broader perspective, **risk reduction policies in CLIMATE territories are increasingly data-driven and grounded in sustainable practices** such as ecosystem restoration and nature-based design. **In preparedness there is a clear emphasis on blending technological tools with community engagement.** Greece's Fire Safety measures (18 points) and Hungary's school-based community service program (16 points)

exemplify how scientific approaches can be combined with civic education to amplify impact.

Finally, in emergency response, the submitted practices highlight the **importance of inter-agency coordination and strategic planning**. Greece's DARDANOS plan (18 points) and Belgium's flood expert working groups (16 points) demonstrate how structured collaboration and real-time data can enhance response effectiveness. It is to be emphasised, that **timely and impactful emergency response is closely tied to continuous preparedness**, where operational readiness, community training, and public awareness serve as foundational pillars for coordinated action.

Policy Recommendations

The following recommendations are designed to support CLIMATE partners in **integrating successful elements from high-performing practices into their territorial strategies and policy instruments**, ultimately enhancing their resilience and operational readiness in the face of diverse climate risks. These recommendations are based on input gathered via the partners' online survey, distilling shared success factors while balancing impact, cost-effectiveness, and sustainability.

Climate change affects all CLIMATE partners. Survey responses revealed that flooding and water management (including scarcity) are widespread concerns across the partnership. Rising temperatures (mean, maximum, and minimum), along with related phenomena such as the urban heat island effect, tropical nights, and hot days, also emerged as key challenges.

Moreover, a comparative analysis of partners' policy instruments highlights **several key objectives**: a) safeguarding infrastructure, b) raising awareness about climate risks, c) strengthening the response capacities of local communities, and d) improving early warning systems.

To this end, the recommendations below are intended to effectively address the needs and challenges of the entire partnership. Partners are encouraged to assess them in relation to their specific needs and capacities (administrative, financial, technical) and consider which measures are most appropriate for integration into their own instruments.

Expand the use of NbS in territorial planning

NbS should be strategically integrated into local and regional climate adaptation strategies, particularly through spatial planning and land-use policy instruments. NbS offer several benefits for improved climate change resilience, including ecological restoration, urban cooling, and water retention, making them especially effective in addressing heatwaves, droughts, and flood risks. Particularly effective actions include:

- Embedding of NbS into urban development plans, such as the creation of green cooling zones and the repurposing of underutilised urban spaces.
- Integration of NbS into stormwater management frameworks, using vegetation buffers, permeable surfaces, and retention basins to mitigate heavy precipitation and water scarcity.

Integrate digital tools into forecasting, awareness, and operational readiness

Digital technologies, such as geospatial information systems (GIS) and remote sensing, should be embedded into territorial DRM systems to enhance forecasting accuracy and institutional coordination, while also improving public awareness. Particularly effective actions include:

- Development of predictive modelling platforms using geospatial and meteorological data to simulate hazard scenarios (e.g. floods, landslides, wildfires).

- Establishment of open data platforms to support cross-agency collaboration and community access to climate risk forecasts.
- Establishment of digital communication channels for real-time alerts and climate risk information dissemination as well as emergency coordination.

Strengthen civic education and youth engagement in climate preparedness

Civic participation, especially among youth, is pivotal in effective preparedness against extreme weather events and climate-related hazards. As with all preparedness measures, centralised coordination of such actions and integration into broader territorial preparedness strategies is essential. Particularly effective actions include:

- Integration of climate hazard preparedness modules into formal education curricula, with emphasis on local risks and response protocols.
- Establishment of volunteer mobilisation frameworks in partnership with NGOs, providing regular and structured training.

Build institutional capacity of civil servants for climate adaptation

Municipal and regional authorities are frontline actors in climate hazard management. Strengthening their technical capacity and operational readiness is essential for effective response and long-term resilience of cities and regions in view of climate change. Particularly effective actions include:

- Establishment of targeted training programs for civil servants on climate risk assessment, emergency planning, and NbS implementation.
- Development of standard operating procedures (SOP) providing a set of step-by-step instructions to guide municipal and regional officials in performing key tasks during an extreme weather emergency, ensuring consistency and preparedness across departments.
- Implementation of regular drills and scenario-based exercises to test coordination mechanisms and improve response times.

Integrate DRM in land use regulations and plans

Land use regulations and plans define what can be built where, designating areas where specific controls apply, such as restrictions on the types of buildings that can be constructed and design requirements. Land use regulations and plans can be updated and revised to support disaster risk reduction, by either restricting certain types of buildings in high-risk zones or establishing specific climate risk requirements for buildings. Particularly effective actions include:

- Establishment of climate hazard high-risk zones where construction of new residential or commercial buildings is prohibited or heavily restricted.
- Updating of building codes to include mandates for buildings' structural designs and construction materials that increase resilience to climate hazards, such as

houses in flood-prone areas to be elevated and houses in wildfire-prone areas to be constructed using steel frames.

Develop a multi-hazard early warning system

An effective multi-hazard early warning system is essential to effective DRM. Key aspects of such a system include:

- Warnings should include both technical information about the magnitude of the hazards (e.g., “winds with gusts of 140 km/h”) but also information about the expected impact (e.g., “winds strong enough to bring down trees and power lines”).
- Warnings should be issued by an authoritative source using a variety of communication channels (e.g., cell broadcast, radio, social media) and mediums (e.g., text, audio).