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Deliverable Phase 3 – Climate risk management

Assess Multiple Climate Risks in Attica Region and improve Adaptation Strategy and Risk Management Plans using CLIMAAX Framework and Toolbox (AtticaReAdy)

Greece, Region of Attica

July 2026

HORIZON-MISS-2021-CLIMA-02-01 - Development of climate change risk assessments in European regions and communities based on a transparent and harmonised Climate Risk Assessment approach

Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101093864. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the European Union nor the granting authority can be held responsible for them.

Document Information

Deliverable Title	Phase 3 - Climate risk management
Brief Description	This deliverable describes Phase 3 of Climate Risk Management for the Region of Attica, focusing on adaptation strategies and improved Risk Management Plans. It builds on the Phase 2 Climate Risk Assessment for heatwaves, wildfires and river flooding, using the CLIMAAX Framework and Toolbox. The deliverable uses the generated risk evidence as a basis for defining climate risk management objectives, identifying adaptation and preparedness measures, and supporting the integration of the results into regional and municipal planning, decision-making and risk management processes.
Project name	AtticaReAdy: Assess Multiple Climate Risks in Attica Region and improve Adaptation Strategy and Risk Management Plans using CLIMAAX Framework and Toolbox.
Country	Greece
Region/Municipality	Region of Attica
Leading Institution	Autonomous Directorate of Civil Protection Directorate of Environment and Climate Change
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Deliverable submission date	31/07/2026
Final version delivery date	27/07/2026
Nature of the Deliverable	R - Report
Dissemination Level	PU - Public

Version	Date	Change editors	Changes
1.0	27/07/2026	Region of Attica	Deliverable submitted

Table of Contents

Document Information 2
List of tables 4
List of figures 5
Abbreviations and acronyms 6
Executive summary 7
1 Introduction 8
1.1 Main objectives of the project 8
1.2 Project team 8
1.3 Outline of the document's structure 9
2 Local profile 10
2.1 Summary of Key Risk Assessment results 10
2.2 Key implementation mechanisms and policy context for CRM 12
2.3 Key actors and systems for CRM 13
2.4 Lessons learned from past events 16
3 Climate risk management - phase 3 17
3.1 CRM objectives 17
3.2 Supportive elements for effective CRM 19
3.3 Potential CRM measures 21
3.4 Integration into planning and decision making 26
4 Project Evaluation 30
4.1 Usability of the results 30
4.2 Lessons learned 31
5 Conclusions Phase 3 34
6 Progress evaluation 36
6.1 Project outputs 36
7 Supporting documentation 38
8 References 39

List of tables

Table 2-1: Summary of priority climate risks and resilience capacity 11
Table 2-2: Key actors and systems for Climate Risk Management in Attica 14
Table 3-1: Primary CRM objectives and indicative assessment indicators 17
Table 3-2: Complementary CRM objectives and indicative assessment indicators 18
Table 3-3: Supportive elements for effective CRM in the Region of Attica 20
Table 3-4: Potential CRM measures for the priority climate risks 22
Table 6-1: Overview key performance indicators 36
Table 6-2: Overview milestones 37

List of figures

Figure 2-1: Summary evaluation of key risks derived from the Key Risk Assessment Excel tool, based on Phase 2 results. 10

Abbreviations and acronyms

Abbreviation / acronym	Description
CoP	Community of Practice
Copernicus EMS	Copernicus Emergency Management Service
CRM	Climate Risk Management
EFAS	European Flood Awareness System
EFFIS	European Forest Fire Information System
EKAB	National Centre for Emergency Care
FRMP	Flood Risk Management Plan
HFS	Hellenic Fire Service
HNMS	Hellenic National Meteorological Service
KPI	Key Performance Indicator
NbS	Nature-based Solutions
NOA	National Observatory of Athens
RCCAP	Regional Climate Change Adaptation Plan

Executive summary

This deliverable presents Phase 3 of the AtticaReAdy project, focusing on the transition from Climate Risk Assessment to Climate Risk Management for Attica. It builds on the Phase 2 Climate Risk Assessment, which identified heatwaves, wildfires and river flooding as priority climate risks. The purpose is to translate Phase 2 climate-risk evidence into practical objectives, indicators, measures, planning recommendations and monitoring arrangements that support regional and municipal decision-making. The deliverable addresses the need to move beyond risk identification and demonstrates how climate-risk information can be integrated into adaptation planning, Civil Protection, spatial planning and investment decisions to increase preparedness, protect vulnerable groups and strengthen climate resilience.

The main output of Phase 3 is a structured Climate Risk Management (CRM) framework which includes CRM objectives, indicative assessment indicators, the identification of adaptation and preparedness measures, the assessment of supportive conditions for implementation, the development of recommendations for integration into planning and decision-making processes, and stakeholder engagement through consultation and workshop activities. The objectives focus on reducing population exposure, reducing expected economic losses, protecting critical infrastructure, improving Civil Protection preparedness, protecting vulnerable population groups and strengthening knowledge, monitoring and evidence-based decision-making.

Priority measures were identified for the three risks. For wildfires, these include firebreaks, fuel-load reduction, vegetation clearance, water-supply infrastructure, early-warning systems and evacuation-route planning. For heatwaves, they include cooling spaces, support mechanisms, urban greening, shading interventions, public-health preparedness and climate-proofing of buildings. For river flooding, they include flood-protection infrastructure, drainage upgrades, retention measures, nature-based solutions and integration of flood-risk information into planning. An important outcome is the confirmation of previous findings and planning priorities recognized at regional level. The AtticaReAdy results are consistent with the Regional Climate Change Adaptation Plan, Flood Risk Management Plans and lessons learned from major climate-related events. This consistency increases confidence in the results and facilitates integration into existing planning and decision-making processes.

A key finding is that CRM in Attica should not be limited to stand-alone adaptation projects, but should be integrated into public buildings, infrastructure projects, technical works, spatial planning decisions and investment programs. Justice and equity are central, as vulnerable groups and communities in overheated urban districts, wildland-urban interface areas and flood-prone zones require targeted consideration. Stakeholder engagement confirmed the relevance of the outputs and highlighted the need for continued tool use, further workshops, municipal collaboration, local data, modern datasets, remote sensing and stronger interaction between municipalities and the Region.

Phase 3 of AtticaReAdy translated the Climate Risk Assessment results into a Climate Risk Management framework for Attica. It strengthens the Region's capacity to use climate-risk information in planning, preparedness, adaptation and investment prioritization. Its main added value is a common evidence base that supports coordination among regional and municipal authorities and evidence-based decision-making. Further progress will depend on updated data, stronger interoperability, municipal support, adequate funding, integration of climate-risk information into formal planning procedures, continued use of CLIMAAX outputs, regular monitoring and further development of the Climate Change Observatory of Attica.

1 Introduction

1.1 Main objectives of the project

The main objective of Phase 3 of the AtticaReAdy project is to translate the climate risk evidence produced during Phase 2 into practical climate risk management priorities, adaptation strategies, preparedness measures and improved planning processes for the Region of Attica. While Phase 2 focused on the refined assessment of heatwave, wildfire and river flooding risks, Phase 3 bridges the gap between climate risk assessment and operational decision-making, ensuring that scientific outputs are transformed into actionable guidance for regional and municipal authorities.

Building on the high-resolution hazard, exposure, vulnerability and risk outputs developed for the Region of Attica, Phase 3 supports the prioritization of areas, population groups, infrastructure and systems that require targeted risk reduction and adaptation action. Particular attention is given to overheated urban areas and vulnerable population groups exposed to heat stress, wildland-urban interface zones affected by wildfire risk, critical transport corridors exposed to wildfire hazard, and flood-prone areas where river flooding may affect residents, assets and critical infrastructure.

Phase 3 contributes to the integration of climate risk information into existing planning instruments, preparedness procedures and future resilience investments. It supports the refinement of the Regional Climate Change Adaptation Plan, the improvement of Disaster Risk Management Plans, and the prioritization of interventions that can strengthen preparedness and adaptive capacity across the Region of Attica (*Region of Attica, 2022; General Secretariat for Civil Protection, 2022; General Secretariat for Civil Protection, 2023).*

A dedicated regional workshop was organized on 15 June 2026 to present and discuss the AtticaReAdy results with regional and municipal stakeholders. The workshop focused on the project methodology, the main findings for heatwaves, wildfires and river flooding, and the connection between Phase 2 risk assessment outputs and Phase 3 adaptation strategies and improved Risk Management Plans. It served as a practical interface between the risk evidence generated by the project and the needs of competent authorities responsible for local and regional planning.

In parallel, Phase 3 supported the structured dissemination of project results through targeted communication and stakeholder-engagement activities. These included the preparation of policy-oriented and stakeholder-oriented material, such as a regional climate adaptation factsheet, a policy note, newsletters, articles and visual information packages. These actions aimed to facilitate the uptake of AtticaReAdy findings by public authorities, municipalities and other relevant stakeholders.

Phase 3 moves the AtticaReAdy project from climate risk assessment to climate risk management. By linking risk evidence with adaptation objectives, governance arrangements, stakeholder engagement, potential measures and monitoring needs, the project supports the Region of Attica in strengthening preparedness, improving adaptive capacity and promoting long-term climate resilience across its territory.

1.2 Project team

The AtticaReAdy project applied the CLIMAAX Framework and Toolbox during Phase 3 with the engagement of staff from the Region of Attica and the support of INNOVECO as an external technical partner. The regional team included representatives from the Autonomous Directorate of

Civil Protection and the Directorate of Environment and Climate Change, which have the mandate to support the implementation of the Regional Climate Change Adaptation Plan, Disaster Risk Management Plans and Civil Protection actions. The team that worked during Phase 3 consisted of:

- Dr Passas Nikos, Geologist, Head of the Directorate of Civil Protection with years of experience in Disaster Risk Assessment and Management.
- Akrivos Constantinos, Engineer, Head of the Directorate of Environment and Climate Change with years of experience in Environment and Climate Change Adaptation.
- Dr Chalari Ioanna, Chemist, Officer of the Directorate of Civil Protection with knowledge of climate, environment and disaster management.
- Dr Parapouli Maria, Chemist, Officer of the Directorate of Environment and Climate Change with climate and environment knowledge.
- MSc Paparrigopoulos Theodoros, Engineer, Officer of the Directorate of Civil Protection with data processing skills and experience from his participation in a number of European projects.
- MSc Giorgos Konstantzos, Environmental Engineer, with climate and environmental expertise.
- Mr. Efstratios Dimopoulos, Environmental Engineer, with climate and environmental expertise.
- MSc Alexandros Massas, Environmental Physicist, with expertise in climate and environmental analysis.

1.3 Outline of the document's structure

The structure of the document follows the CLIMAAX Phase 3 deliverable template and is organized to present the transition from Climate Risk Assessment to Climate Risk Management for the Region of Attica. Section 1 introduces the main objectives of Phase 3, the project team and the overall structure of the deliverable. Section 2 presents the local profile of the Region of Attica, building on the Phase 2 Climate Risk Assessment results and the spatial risk evidence produced for heatwaves, wildfires and river flooding. It summarizes the key risk assessment findings, describes the relevant policy and implementation context for climate risk management, identifies the main actors and systems involved, and reflects on lessons learned from past climate-related events.

Section 3 forms the core of the deliverable and focuses on Climate Risk Management during Phase 3. It presents the main climate risk management objectives for the Region of Attica, identifies the supportive elements required for effective implementation, and outlines potential measures for the priority climate risks identified in Phase 2. These include structural, non-structural, nature-based, social and governance-related measures. The section also describes how the results of the Climate Risk Assessment can be integrated into regional and municipal planning, Disaster Risk Management Plans, Climate Change Adaptation Plans and future decision-making processes.

Section 4 provides the project evaluation, focusing on the usability of the results and the main lessons learned during Phase 3, including stakeholder engagement, communication of results and practical uptake of the findings. Section 5 presents the conclusions of Phase 3, summarizing the key findings, remaining challenges and potential improvements for future work. Section 6 provides an overview of the progress achieved during this phase, including project outputs, milestones and key performance indicators. Finally, the supporting documentation produced or used during this stage is presented in Section 7, while Section 8 includes the references used throughout the deliverable.

2 Local profile

2.1 Summary of Key Risk Assessment results

The Phase 2 Climate Risk Assessment for the Region of Attica focused on three priority climate risks: heatwaves, wildfires and river flooding. The assessment produced spatially explicit hazard, exposure, vulnerability and risk outputs, allowing the identification of priority areas, exposed population groups, critical infrastructure and systems requiring targeted climate risk management action (*Greenham et al., 2024; Maragno et al., 2020*).

The Key Risk Assessment Evaluation Dashboard was used to support the interpretation of the results across severity, urgency and resilience capacity dimensions. Based on this process, wildfires and heatwaves were classified as very high priority risks, while river flooding was classified as a high priority risk for the Region of Attica. Wildfires represent a fast-onset and potentially catastrophic risk, particularly in wildland-urban interface areas and along critical transport and evacuation corridors. Heatwaves represent a recurrent and spatially widespread risk, especially in dense urban areas where high thermal stress overlaps with elevated social vulnerability (*Maragno et al., 2020; Sestito et al., 2025*). River flooding is more spatially concentrated but can generate significant impacts where flood-prone zones intersect with dense urban land uses, critical infrastructure and high asset values.

The resilience capacity of the Region of Attica is assessed as medium for all three priority climate risks. This reflects the existence of institutional mandates, Civil Protection mechanisms, planning instruments, technical experience and ongoing prevention and preparedness actions. However, resilience capacity is constrained by uneven technical and financial capacity across municipalities, data gaps, limited interoperability between information systems, and the need for more systematic integration of climate risk outputs into operational and planning processes.

Risk Workflow	Severity		Urgency	Capacity	Risk Priority
	C	F		Resilience/ CRM	
River flooding	3	4	3	2	High
Heatwaves	3	4	3	2	Very high
Fire	3	4	4	2	Very high

Severity	Urgency	Resilience Capacity	Risk Ranking
Critical	Immediate action needed	High	Very high
Substantial	More action needed	Substantial	High
Moderate	Watching brief	Medium	Moderate
Limited	No action needed	Low	Low

Figure 2-1: Summary evaluation of key risks derived from the Key Risk Assessment Excel tool, based on Phase 2 results.

Table 2-1: Summary of priority climate risks and resilience capacity

Priority climate risk	*Resilience capacity (low, medium, substantial, high)*	*Description of the resilience capacity (such as existing knowledge, planned measures, gaps)*	*Stakeholders, experts and priority groups involved in the key risk assessment & modality of engagement*
Wildfires	Medium	The Region has an established Civil Protection framework and extensive operational experience from recurrent major wildfire events, including Penteli, Keratea and Kineta. Existing mechanisms include the national and regional "IOLAOS" Civil Protection Plan, municipal local plans, coordination with the HFS and competent authorities, and the Regional Civil Protection Coordination Body. Planned or ongoing measures include firebreaks, fuel-load clearance, early-warning systems such as 112, SMS and applications, and reinforcement of water tanks and water abstraction points. Remaining gaps concern real-time micro-meteorological data, interoperability between municipalities, the Region and the Ministry, and uneven municipal capacity.	Key stakeholders include the Region of Attica, the HFS and municipalities, responsible for planning, coordination, emergency preparedness and response. HNMS and NOA provide meteorological information, forecasts and fire-risk maps, while Forest Directorates provide technical consultation and field-assessment support. Priority groups include residents of wildland–urban interface areas, vulnerable groups and users of exposed transport corridors. Engagement is carried out through coordination meetings, technical consultations, data exchange, review of risk outputs and field assessments.
Heatwaves	Medium	The Region has significant institutional and operational experience in managing extreme-temperature risks, due to frequent intense heatwaves and high metropolitan population density. Existing mechanisms include public information procedures, monitoring of meteorological forecasts, coordination with municipalities and public-health services, and activation of air-conditioned public spaces declared by municipalities. The RCCAP recognizes heatwaves as a major climate risk and includes adaptation actions for health, the built environment and infrastructure, while the Climate Change Observatory supports monitoring and vulnerability assessment. Remaining gaps concern national and regional heatwave management plans, local heat-stress monitoring, urban heat-island mitigation, protection of vulnerable groups, integration of climate data into spatial and urban planning, and systematic evaluation of adaptation effectiveness.	Key stakeholders include the Region of Attica, municipalities and Civil Protection services, involved in preparedness, coordination, public information and cooling-space activation. HNMS, NOA and relevant scientific bodies provide meteorological data, forecasts and heat-related information. Health and social-care services support vulnerable groups. Priority groups include elderly people, dependent people, children, outdoor workers and residents of overheated urban areas. Engagement is carried out through data exchange, review of heat-risk outputs, technical discussions and workshop participation.
River Flooding	Medium	The Region has an institutional and operational framework for flood-risk management, supported by the approved and revised FRMPs for the Attica Water District (EL06), flood hazard and risk maps, and Directive 2007/60/EC. Preparedness and response are supported by the "DARDANOS 2" Civil Protection Plan, which defines procedures for prevention, mobilization, incident management and recovery. The Region also has experience from major flood events and flood-prone areas, including Mandra, Cephissus, Sarantapotamos, Pikrodafni and Xereas Kropias, as well as ongoing or planned flood-protection works, stream cleaning and drainage interventions. Remaining gaps include mature flood-protection works in high-risk areas, stormwater-network upgrades in dense urban areas, data interoperability, integration of climate projections into design, stronger early-warning systems, and restoration and maintenance of natural streams and floodplains.	Key stakeholders include the Region of Attica, municipalities, Civil Protection authorities, technical services, water-management and infrastructure authorities, hydraulic and environmental experts, and flood-prone communities. Priority groups include residents and businesses in flood-prone zones, users of exposed transport corridors, critical infrastructure operators and communities along the Cephissus floodplain. Engagement is carried out through technical consultations, review of flood-risk outputs, data exchange, interpretation of maps and indicators, and workshop participation.

The assessment of resilience capacity shows that the Region of Attica has an established institutional and operational basis for managing the three priority climate risks. This includes Civil Protection mechanisms, regional and municipal planning structures, cooperation with competent authorities, technical experience and ongoing prevention and preparedness actions. However, resilience capacity remains medium rather than high, as all three risks are affected by common constraints, including uneven municipal capacity, data gaps, limited interoperability between information systems, infrastructure limitations and the need to integrate climate-risk maps and indicators more systematically into prevention, preparedness, spatial planning and investment decisions.

2.2 Key implementation mechanisms and policy context for CRM

Climate Risk Management in the Region of Attica is shaped by a multi-level policy and governance framework that combines European, national, regional and local instruments. This framework includes climate adaptation planning, Civil Protection and disaster risk management, flood-risk management, spatial and urban planning, public health, infrastructure planning, environmental protection and municipal operational responsibilities.

For the priority risks examined in AtticaReAdy, the most relevant sectors are Civil Protection, water and flood-risk management, public health and social care, spatial and urban planning, transport and critical infrastructure, environmental protection and biodiversity, and municipal services. Spatial and urban planning also provide important implementation pathways for CRM, as recent European evidence shows that the integration of risk management, climate adaptation and spatial planning can support more proactive territorial governance (*Farinós-Dasí et al., 2025*).

At regional level, the main strategic instrument is the Regional Climate Change Adaptation Plan of Attica. The Plan provides the policy framework for identifying climate threats, assessing vulnerability and prioritizing adaptation measures for the Region. In the context of Phase 3, the outputs of the Climate Risk Assessment can support the refinement, implementation and monitoring of the Plan by providing spatially explicit evidence on priority risk areas, exposed population groups and vulnerable infrastructure (*Region of Attica, 2022*).

A second key regional mechanism is the Climate Change Observatory of the Region of Attica. The Observatory can support the monitoring of climate-change impacts and the progress of adaptation actions. It can also function as a decision-support and knowledge-dissemination mechanism by hosting or communicating climate-risk information, indicators, maps and relevant outputs to municipalities, public authorities and other stakeholders. Its role is further strengthened by the inclusion of data systems, pilot flood early-warning applications and citizen-participation tools, which can support evidence-based decision-making, continuous risk and vulnerability assessment and the monitoring of adaptation indicators.

Civil Protection is the main operational mechanism for preparedness, emergency response and recovery. The Region of Attica participates in the national Civil Protection system under the coordination of the Ministry for Climate Crisis and Civil Protection and the General Secretariat for Civil Protection. Relevant mechanisms include prevention and response plans for natural disasters, the national 112 warning system and coordination procedures among the Region, municipalities, the HFS, emergency services and other operational actors.

For wildfire risk, the relevant framework includes the “IOLAOS” Civil Protection Plan, regional Civil Protection mechanisms and local emergency plans (*General Secretariat for Civil Protection, 2023*). For river flooding, CRM is supported by the Flood Risk Management Plans for the Attica Water District, flood hazard and risk maps, Directive 2007/60/EC and the “DARDANOS 2” Civil Protection Plan *(European Parliament and Council, 2007; Hellenic Ministry of Environment and Energy, 2025; General Secretariat for Civil Protection, 2022)*. For heatwaves, the policy context combines climate adaptation, Civil Protection, public health, social care, meteorological warnings, public information, municipal cooling spaces and support to vulnerable groups.

The integration of risk maps and vulnerability indicators into land-use, zoning, urban plans and infrastructure planning can help avoid new exposure in high-risk areas and support the prioritization of climate-resilient investments. At local level, municipalities are essential for translating regional risk evidence into practical action, including local emergency planning, public information, operation of cooling spaces, local prevention measures, support to vulnerable groups and small-scale infrastructure interventions.

Where relevant, private and semi-public infrastructure operators, facility owners and service providers also have an important role in integrating climate-risk information into asset management, continuity planning and future investment decisions.

The policy and implementation framework in Attica provides a solid basis for CRM. However, successful implementation depends on stronger integration between climate adaptation planning, Civil Protection, spatial planning, technical infrastructure programs and municipal action. Key enabling conditions include the systematic use of CLIMAAX outputs in planning processes, common GIS standards, interoperable data systems, regular updating of risk maps, integration of climate projections into technical studies and continuous support to municipalities.

2.3 Key actors and systems for CRM

The development and implementation of Climate Risk Management strategies in the Region of Attica involves institutional, technical, operational and social actors operating at different governance levels. These actors contribute to climate risk assessment, prevention, preparedness, response, adaptation implementation, monitoring and communication.

Risk ownership in the Region of Attica is organized within the existing Greek institutional framework. The Region of Attica has a central role in the identification, assessment and coordination of CRM actions, supported by project partners, technical experts and scientific bodies. Responsibility for risk reduction and adaptation is shared across regional directorates, municipalities and sectoral authorities responsible for Civil Protection, environment, infrastructure, transport, health, social care, spatial planning and local operations.

During the project, stakeholder engagement evolved across the different steps of the CLIMAAX Framework. In Phase 1, the Community of Practice supported the scoping process and the identification of priority hazards. In Phase 2, engagement focused on risk exploration and technical refinement, including the validation of the heatwave, wildfire and river flooding workflows, the review of input datasets, methodological assumptions and intermediate outputs. In Phase 3, engagement shifted towards Climate Risk Management, focusing on the practical use of results through the regional workshop, dissemination material and the collection of stakeholder feedback.

Table 2-2: Key actors and systems for Climate Risk Management in Attica

Key actors	*Role and responsibility*	*Motivation and needs*	*Opportunities related to the their active involvement in CRM*	*Barriers related to the their active involvement in CRM*	*Type of engagement*
Ministry for Climate Crisis and Civil Protection and General Secretariat for Civil Protection	National coordination of Civil Protection policy, preparedness, warning procedures, mobilization and support to regional/local authorities.	Need for consistent regional risk information to support preparedness planning, early warning, coordination and resource mobilization.	Use of CLIMAAX outputs to link regional risk evidence with national Civil Protection planning, warning systems and emergency coordination.	Cross-scale coordination challenges, different data systems, timely information flows and operational pressure during emergencies.	Institutional coordination, Civil Protection mechanisms, warning procedures, technical exchange, emergency planning and dissemination activities.
Region of Attica - Autonomous Directorate of Civil Protection and Directorate of Environment and Climate Change	Coordination of Civil Protection actions, adaptation planning, implementation and monitoring of the Regional Climate Change Adaptation Plan, emergency preparedness, response and recovery.	Need for reliable, spatially explicit and operationally usable climate risk information to support planning, preparedness and prioritization of interventions.	Integration of CLIMAAX outputs into Disaster Risk Management Plans, adaptation planning, early-warning procedures, prioritization of measures and regional coordination mechanisms.	Data interoperability issues, need for regular updating of risk information, staff resources and coordination across multiple governance levels.	Direct involvement throughout the project, including scoping, risk analysis, interpretation of results, dissemination and Phase 3 workshop.
Municipalities of the Region of Attica	Local emergency planning, public information, maintenance and prevention actions, operation of cooling spaces, support to vulnerable groups and implementation of local adaptation measures.	Need for accessible municipality-level risk information, technical guidance and practical tools to support local planning and decision-making.	Use of risk maps and indicators to prioritize local interventions, update local emergency plans, identify vulnerable groups and support adaptation measures.	Uneven technical capacity, limited staff and financial resources, variable data availability and different levels of readiness across municipalities.	Participation through the Community of Practice, technical exchanges, workshop participation and questionnaire feedback.
First responders: HFS, Hellenic Police, EKAB and emergency-response actors	Operational response to wildfires, floods, heatwave-related emergencies and other climate-related incidents. Their role includes firefighting, rescue, evacuation support, traffic management,	Need for timely, location-specific and interoperable risk information to improve preparedness, emergency access, evacuation planning, resource	Integration of CLIMAAX risk maps and indicators into preparedness exercises, evacuation planning, emergency-access planning, response protocols and multi-	Fast-onset events, operational pressure during emergencies, fragmented data flows, different command structures and need for harmonized	Engagement through Civil Protection coordination mechanisms, preparedness planning, operational consultations, exercises, data

Key actors	*Role and responsibility*	*Motivation and needs*	*Opportunities related to the their active involvement in CRM*	*Barriers related to the their active involvement in CRM*	*Type of engagement*
	emergency medical response and incident management.	allocation and operational coordination.	agency coordination procedures.	information between operational actors.	exchange and emergency-response coordination.
Scientific and technical bodies, including HNMS, NOA, Forest Directorates and relevant experts	Provision of meteorological, environmental, forest-risk, hydrological and climate data, forecasts, modelling, technical interpretation and risk-analysis support.	Need for access to local data, feedback from competent authorities and clear understanding of planning and operational needs.	Strengthening of evidence-based decision-making, early warning, monitoring, technical interpretation and regular updating of climate-risk information.	Data resolution limitations, real-time data availability, methodological uncertainty and need to communicate technical results in an operationally useful way.	Data provision, methodological support, review of outputs, technical interpretation, technical consultations, field assessments and participation in project activities.
Health and social-care services	Protection of vulnerable groups, public-health preparedness, social-care outreach and support during heatwaves, floods, wildfires and other climate-related emergencies.	Need for information on vulnerable groups, exposed populations, high-risk areas and priority support needs.	Use of CLIMAAX outputs for targeted public-health actions, social-care outreach, cooling-space planning, support to vulnerable groups and emergency preparedness.	Fragmented vulnerability data, privacy constraints, limited staff resources, dependence on municipal-level implementation and need for better coordination with Civil Protection mechanisms.	Direct or indirect engagement through regional and municipal structures, vulnerability indicators, technical discussions, dissemination material and workshop feedback.
Infrastructure operators and utility providers	Management, maintenance and continuity planning for transport, water, stormwater, energy, telecommunications and other critical services.	Need for risk information to identify exposed assets, assess continuity risks and prioritize upgrades.	Support for infrastructure risk screening, climate-proofing, upgrade prioritization, continuity planning and technical designs.	Fragmented asset data, confidentiality constraints, high costs and long implementation timelines.	Data exchange, technical consultations, infrastructure planning, sectoral planning and future regional/municipal coordination.
Priority groups, civil society and voluntary organizations	Community preparedness, local response, awareness, self-protection and support to vulnerable groups.	Need for accessible information, clear communication, coordination and support for preparedness and response.	Improved awareness, preparedness, community resilience, protection of vulnerable groups and integration of local knowledge.	Limited direct engagement, varying awareness, social vulnerability, accessibility barriers and need for structured participation.	Reflected through vulnerability/exposure indicators, dissemination, workshop feedback, awareness actions and future engagement needs.

2.4 Lessons learned from past events

The Region of Attica has experienced several high-impact climate-related events in recent years, including destructive wildfires, severe flood events and recurrent heatwave episodes. These events demonstrate that climate risks in Attica are shaped by the interaction between natural hazards, dense urban development, land-use patterns, infrastructure exposure and social vulnerability.

The **wildfire** that affected Mati and Nea Makri in July 2018 highlighted the extreme vulnerability of settlements located in wildland-urban interface and coastal areas. The rapid spread of the fire was intensified by strong winds and by the presence of extensive residential development within and around forested areas. The event demonstrated the need for early and organized preventive evacuation of high-risk settlements, improved coordination between the HFS, Civil Protection, local authorities and security forces, stronger early-warning and public-information systems, better spatial planning and the maintenance of safe escape routes in coastal and peri-urban settlements. The lessons remain highly relevant for wildfire-risk management in Attica, as extreme heat, drought and wind conditions are expected to intensify under climate change. Prevention, preparedness, evacuation planning, public communication, emergency access and land-use planning must be core components of Climate Risk Management.

More **recent wildfire** events, including Varympompi in 2021, Fyli in 2023 and North-East Attica in 2024, further confirm that Attica is highly exposed to forest and peri-urban fire risk. These events reinforce the need to move from a primarily response-oriented approach towards an integrated prevention, preparedness and adaptation approach. Key lessons include the creation and maintenance of firebreaks, systematic fuel-load clearance around settlements, the development of fire-resilient communities, and the use of satellite data, fire-risk forecasts and digital tools for early mobilization.

The severe **flood event** that affected Mandra and Nea Peramos in November 2017 demonstrated the high vulnerability of densely developed areas to short-duration, high-intensity rainfall and flash-flood processes. The event caused severe impacts on residents, businesses and infrastructure and highlighted how interventions in natural streambeds, insufficient flood-protection works and inappropriate development in flood-prone areas can increase flood impacts. The main lessons relate to the protection and restoration of natural streams, avoidance of new exposure in flood-prone zones, climate-informed flood-protection works, drainage upgrades and the development of integrated early-warning systems for flash floods. The Mandra and Nea Peramos **flood** also shows the importance of integrating flood-risk management into spatial and urban planning. Flood-risk information should be used to guide land-use decisions, infrastructure design, local preparedness procedures and the prioritization of flood-protection investments. In addition, citizens and local authorities need to be better prepared for extreme hydrometeorological events, especially in areas where intense rainfall, urbanization and limited drainage capacity overlap.

Heatwaves represent a different type of risk, as they often develop over several days and may not always produce immediately visible physical damage. However, recurrent and intense heatwave episodes create significant public-health and social risks, particularly in dense urban areas affected by the urban heat island effect. Past heatwave experience shows that preparedness must focus on vulnerable population groups, effective public communication, early warning, municipal cooling spaces, social-care outreach and coordination between Civil Protection, health and municipal services (*Maragno et al., 2020; Sestito et al., 2025; Region of Attica, 2022*).

3 Climate risk management - phase 3

3.1 CRM objectives

The Climate Risk Management objectives for the Region of Attica are defined on the basis of the Phase 2 Climate Risk Assessment results, the Key Risk Assessment priorities and the policy priorities identified by the Region of Attica. They focus on the three priority climate risks examined in AticaReAdy: heatwaves, wildfires and river flooding.

The objectives aim to reduce exposure and vulnerability, strengthen preparedness, protect critical infrastructure and vulnerable population groups, support evidence-based planning and improve the operational use of climate-risk information by regional and municipal authorities. They are also consistent with the Regional Climate Change Adaptation Plan of Attica and the wider national adaptation and Civil Protection framework *(Region of Attica, 2022; General Secretariat for Civil Protection, 2022; General Secretariat for Civil Protection, 2023*).

Based on the priorities of the Regional Climate Change Adaptation Plan, several CRM-relevant objectives can be identified. These include the reduction of population exposure to climate risks, reduction of expected economic losses, protection of critical infrastructure, improvement of Civil Protection preparedness, protection of vulnerable social groups and strengthening of knowledge, monitoring and decision-making. Although the Regional Climate Change Adaptation Plan does not define quantified targets in all cases, it establishes clear priority areas and foresees the development of monitoring systems and indicators to evaluate adaptation and climate risk management progress over time.

Table 3-1: Primary CRM objectives and indicative assessment indicators

Primary objectives	*Examples of assessment indicators*
Reduction in the number of people exposed to heatwaves, wildfires and river flooding	I) Percentage of population located within high flood-risk zones. II) Percentage of population located within very high wildfire-risk zones. III) Number of residents affected by extreme heat episodes.
Reduce expected economic losses and damage to public and private infrastructure from extreme events	I) Estimated annual damage from floods. II) Estimated annual damage from wildfires. III) Number of buildings affected per event. IV) Amount of compensation paid after natural disasters.
Strengthen the resilience of transport, energy, water supply and telecommunications networks	I) Percentage of critical infrastructure assets with a climate-resilience plan. II) Length of road network covered by climate-risk assessment. III) Number of disruption incidents affecting critical services due to extreme events. IV) Percentage of infrastructure upgraded according to resilience requirements.

Primary objectives	*Examples of assessment indicators*
Improve the preparedness of Civil Protection and relevant services by strengthening prevention, operational readiness and emergency management	I) Time required to activate emergency plans. II) Number of preparedness exercises per year. III) Percentage of population covered by early-warning systems. IV) Number of trained Civil Protection staff and volunteers.
Protect vulnerable social groups by reducing the impacts of heatwaves and other hazards on older people, children, individuals with chronic health conditions and socially vulnerable populations.	I) Mortality and morbidity related to extreme temperatures. II) Number of cooling spaces and shelters. III) Population covered by heatwave-protection plans. IV) Number of awareness and support actions targeting vulnerable groups.
Strengthen knowledge, monitoring and decision-making through the systematic monitoring of climate vulnerability and the evaluation of the effectiveness of adaptation measures.	I) Operation of a regional climate-risk monitoring system. II) Number of available vulnerability indicators by sector. III) Frequency of risk-map updates. IV) Percentage of Regional Climate Change Adaptation Plan actions implemented.

The primary CRM objectives reflect the need to reduce exposure, vulnerability and potential losses across the three priority climate risks. For heatwaves, the focus is on dense urban areas, vulnerable population groups and public health impacts. For wildfires, the focus is on wildland-urban interface areas, exposed settlements, transport corridors and emergency-access routes. For river flooding, the focus is on flood-prone areas where hazard overlaps with population, buildings, critical infrastructure and economic assets.

The objectives also include preparedness, protection of critical infrastructure, support to vulnerable groups and evidence-based decision-making. These elements are closely linked to the Region's monitoring framework, including the Climate Change Observatory of Attica and the monitoring provisions of the Regional Climate Change Adaptation Plan.

Table 3-2: Complementary CRM objectives and indicative assessment indicators

Additional objectives	*Examples of assessment indicators*
Public health protection	I) Decrease in hospitalizations during heatwaves. II) Number of municipalities activating heatwave preparedness procedures. III) Number of vulnerable residents supported during extreme heat events.
Social well-being and urban livability	I) Percentage of urban area covered by parks, green spaces or shaded public areas. II) Number of cooling spaces available to the public.
Environmental quality and ecosystem protection	I) Area of protected or restored streams and floodplains.

Additional objectives	*Examples of assessment indicators*
	II) Area of vegetation and fuel-load management in wildfire-prone zones. III) Area covered by nature-based solutions, such as urban parks, green roofs and green corridors.
Climate-resilient infrastructure and technical works	I) Number of flood-protection, drainage or stormwater projects designed using climate projections. II) Number of wildfire-prevention infrastructure projects implemented. III) Number of infrastructure projects prioritized through risk assessment or cost-benefit analysis.
Capacity-building and institutional learning	I) Number of staff trained in risk modelling, indicators and climate projections. II) Number of preparedness exercises with local actors.
Justice and equity	I) Vulnerable groups explicitly considered in risk maps, preparedness plans and adaptation measures. II) Number of actions targeting elderly people, children, people with chronic illnesses, socially vulnerable groups and residents of high-risk areas. III) Population of vulnerable groups covered by warning, support, cooling, evacuation or protection measures.

Justice and equity considerations are embedded in the CRM objectives by explicitly recognizing that climate risks do not affect all groups equally. Heatwaves can disproportionately affect elderly people, dependent people, children, people with chronic diseases, socially isolated individuals and outdoor workers. Wildfires can disproportionately affect residents of wildland-urban interface areas, people with limited evacuation capacity and communities located along constrained road networks. Floods can disproportionately affect residents and businesses in flood-prone areas, users of exposed transport corridors and communities with limited capacity to recover after a damaging event *(Maragno et al., 2020; Sestito et al., 2025)*.

CRM objectives in Attica focus on reducing the exposure and vulnerability of priority groups and critical livelihoods, including outdoor workers, small businesses in flood-prone zones and communities dependent on exposed transport or service infrastructure. The use of spatial risk evidence, vulnerability indicators and municipal-level information can support more equitable prioritization of measures, ensuring that adaptation and preparedness actions are directed to the areas and population groups where needs are greatest *(Maragno et al., 2020; Sestito et al., 2025)*.

3.2 Supportive elements for effective CRM

The effective implementation of Climate Risk Management in the Region of Attica requires supportive elements that connect climate-risk evidence with planning, operational preparedness, technical interventions, social awareness and governance capacity.

The supportive elements for Attica are linked with the three priority climate risks identified in Phase 2: heatwaves, wildfires and river flooding. They include knowledge and data, technical and

infrastructure systems, social and behavioral aspects, citizen engagement, financial and human resources, and governance arrangements. The Region of Attica has specifically highlighted the need to integrate risk and vulnerability indicators into regional and local adaptation plans, produce new high-resolution risk maps, develop a regional climate-risk data hub, and prioritize projects using cost-benefit analysis and climate scenarios.

Table 3-3: Supportive elements for effective CRM in the Region of Attica

Supportive elements for effective CRM	*Description*
Knowledge and data	• Spatial risk evidence for heatwaves, wildfires and river flooding. • Integration of risk and vulnerability indicators into Regional and Local Adaptation Plans. • Production of new high-resolution risk maps and regular update of indicators. • Development of a regional climate-risk data hub. • Organization of existing data from previous studies, plans and assessments into Civil Protection databases. • Use of post-disaster data, such as affected businesses, damaged buildings, compensation payments and recovery needs, to support future risk assessment and recovery planning.
Tech and infrastructure	• Flood-protection works, stormwater upgrades, stream management and restoration work. • Fire-protection zones, fuel-load clearance, firebreaks, water tanks and water abstraction points. • Infrastructure for managing heat stress, such as air-conditioned public spaces. • Early-warning systems, including 112 and meteorological warnings. • Development of a Civil Protection management or operational center, with potential connection to Copernicus EMS, EFAS, EFFIS and national warning systems. • Participation in European projects supporting early warning, monitoring and preparedness.
Social-behavioral aspects	• Information campaigns for floods, wildfires and heatwaves. • Public awareness actions and preparedness exercises. • Strengthening of local coping capacity before and during extreme events. • Behavioral readiness for fast-onset events, such as wildfires and flash floods, and for heatwave episodes where timely action can reduce health impacts.
Citizen engagement	• Information days, workshops and public-awareness activities. • Educational programs in schools and local communities. • Preparedness exercises with local actors. • Targeted engagement of vulnerable groups, including elderly people, children, dependent people, people with chronic illnesses and socially vulnerable populations.

Supportive elements for effective CRM	*Description*
	• Support networks during heatwaves and support for evacuation or preventive relocation during wildfires and floods.
Finances & resources	• Funding for technical works, nature-based solutions, monitoring systems and preparedness mechanisms. • Staff training and municipal support. • Prioritization of projects using risk assessment, cost-benefit analysis and climate scenarios. • Use of European programs, NSRF/ESPA funding instruments and national funding mechanisms for climate-risk management, Civil Protection, infrastructure resilience and disaster recovery. • Participation in European projects, such as MedEWSa and GOBEYOND.
Governance arrangements & political leadership	• Existing legislative framework and specification of roles through Civil Protection and sectoral plans. • Clear mandates and coordination mechanisms between the Region, municipalities, national authorities, HFS, Hellenic Police, EKAB, voluntary groups and other actors. • Annual updating of operational plans based on new risk data. • Staff training in risk modelling, indicators and climate projections. • Dissemination of data and support to municipalities for local adaptation plans and operational risk-management tools. • Data-sharing protocols, common GIS standards and interoperability between the Region, municipalities and operational authorities.

The supportive elements for CRM in Attica combine data, infrastructure, technology, governance, resources and social preparedness. These elements are particularly important because the implementation of CRM depends not only on technical measures, but also on institutional capacity, coordination between regional and municipal authorities, citizen engagement and the protection of vulnerable groups *(Greenham et al., 2024; Farinós-Dasí et al., 2025)*.

3.3 Potential CRM measures

The potential Climate Risk Management measures for the Region of Attica are defined on the basis of the Phase 2 risk evidence, the CRM objectives presented above, and the priorities identified by the Region of Attica. The measures address the three priority climate risks examined in AtticaReAdy: heatwaves, wildfires and river flooding.

The proposed measures include structural, non-structural, nature-based, human/social and governance-related actions. They are not limited to stand-alone adaptation investments, but also include actions through which future public works, buildings, infrastructure projects, urban interventions and operational plans should integrate a climate adaptation component.

Table 3-4: Potential CRM measures for the priority climate risks

Key climate risk	*CRM measure*	*Effectiveness / Risk reduction (high, medium, low)*	*Contribution to CRM objectives*	*Possible co-benefits*	*Timeline (short, medium, long term)*	*Responsible organization*	*Possible adaptation limits*
Wildfires	Establishment and maintenance of firebreaks, fuel-load reduction zones and vegetation clearance in priority wildland-urban interface areas.	High	Reduces fire intensity and spread and protects settlements, critical infrastructure and evacuation routes.	Improved forest management, ecosystem protection and safer access for emergency services.	Short to medium term	Region of Attica, Municipalities, Forest Directorates, HFS	Effectiveness may decline under extreme fire-weather conditions. Also requires continuous maintenance and landowner cooperation.
Wildfires	Reinforcement of water tanks, hydrants and water abstraction points in high-risk wildfire areas.	Medium to high	Improves firefighting capacity and response time in areas with limited water availability.	Supports emergency operations and may improve local water-security infrastructure.	Short to medium term	Region of Attica, Municipalities, HFS, water utilities	Limited by water availability, accessibility, maintenance requirements and extreme drought conditions.
Wildfires	Development of wildfire monitoring, early-warning and operational preparedness systems connected to 112, EFFIS, Copernicus EMS, national warning systems, local meteorological information and the proposed Civil Protection operational center.	High	Supports earlier detection, situational awareness, resource mobilization, evacuation decisions and coordinated response.	Improves inter-agency coordination, strengthens multi-hazard emergency management and supports the operational use of European project outputs, such as MedEWSa and GOBEYOND.	Medium term	Region of Attica, Ministry for Climate Crisis and Civil Protection, HFS, HNMS, NOA, Municipalities, scientific institutions	Depends on real-time data availability, interoperability, staff capacity, communication reliability and continuity after project completion.
Wildfires	Integration of wildfire-risk maps, CLIMAAX outputs, vulnerability indicators and evacuation-route information into spatial planning, local emergency plans and annual plan updates.	High	Reduces exposure in high-risk zones and supports safer settlement planning, emergency access and prioritization of wildfire-prevention investments.	Better land-use decisions, improved emergency access, reduced future vulnerability and stronger use of common GIS standards and data-sharing protocols.	Medium term	Region of Attica, Municipalities, planning authorities, Civil Protection authorities, Forest Directorates	Land-use constraints, existing development patterns, fragmented responsibilities and implementation complexity may limit effectiveness.
Wildfires	Public-awareness campaigns, self-protection guidance, workshops, preparedness exercises and	Medium to high	Improves preparedness and reduces risk to residents, people with	Strengthens community engagement, trust in warnings, social resilience	Short term and recurring	Region of Attica, Municipalities, HFS, Hellenic Police, EKAB,	Behavioral change may be temporary; effectiveness depends on repeated

Key climate risk	*CRM measure*	*Effectiveness / Risk reduction (high, medium, low)*	*Contribution to CRM objectives*	*Possible co-benefits*	*Timeline (short, medium, long term)*	*Responsible organization*	*Possible adaptation limits*
	targeted support for evacuation or preventive relocation of vulnerable groups in wildfire-prone areas.		limited mobility and communities located along constrained road networks.	and cooperation with voluntary organizations.		social-care services, voluntary organizations	engagement, accessible messages, updated registries, available transport and trained personnel.
Heatwaves	Operation and expansion of air-conditioned public spaces and local support networks during heatwave events.	High	Reduces heat exposure among elderly people, people with health conditions and other vulnerable groups.	Supports social cohesion, public health protection and targeted welfare services.	Short term	Municipalities, Region of Attica, health and social-care services	Effectiveness depends on accessibility, public awareness, opening hours and continuity of electricity supply.
Heatwaves	Urban greening measures, including tree planting, green corridors, park enhancement, green roofs and relevant planned interventions such as the Park Tritsi Master Plan.	Medium to high	Reduces local temperatures, improves thermal comfort and mitigates the urban heat-island effect.	Improved air quality, biodiversity, stormwater retention, recreation and urban livability.	Medium to long term	Region of Attica, Municipalities, urban-planning authorities	Limited by space availability, irrigation needs, maintenance costs and prolonged drought.
Heatwaves	Energy renovation of vulnerable households and climate-proofing of public buildings.	Medium to high	Reduces indoor heat exposure and improves thermal resilience.	Lower energy consumption, reduced energy poverty and improved indoor environmental quality.	Medium to long term	National authorities, Region of Attica, Municipalities, building owners	High upfront costs, ownership constraints and risk of increased cooling demand if measures are poorly designed.
Heatwaves	Heat-health action planning, heat early-warning communication, use of 112 and meteorological warnings where relevant, and adaptation of outdoor work and school activities during extreme heat.	Medium to high	Reduces health impacts and exposure of vulnerable groups, outdoor workers and children.	Improved public health preparedness, safer working and learning conditions, higher risk awareness and better coordination between Civil Protection, health and social-care services.	Short to medium term	Region of Attica, Municipalities, health authorities, schools, employers, Civil Protection authorities	Extreme heat stress may exceed safe thresholds even with behavioral measures; effectiveness depends on timely communication, public trust and institutional coordination.
Heatwaves	Integration of heat-risk maps, CLIMAAX indicators, climate	High	Supports evidence-based planning, municipal	More targeted investments, improved protection of	Medium term	Region of Attica, Municipalities,	Requires updated data, technical capacity, common

Key climate risk	*CRM measure*	*Effectiveness / Risk reduction (high, medium, low)*	*Contribution to CRM objectives*	*Possible co-benefits*	*Timeline (short, medium, long term)*	*Responsible organization*	*Possible adaptation limits*
	scenarios and vulnerability information into urban planning, Local Adaptation Plans and prioritization of heat-reduction interventions.		uptake of CLIMAAX outputs and prioritization of measures through risk assessment, cost-benefit analysis and climate scenarios.	overheated urban districts and stronger alignment between regional and municipal adaptation planning.		Directorate of Environment and Climate Change, urban-planning authorities, scientific partners	GIS standards, funding availability and integration into existing planning cycles.
Heatwaves	Public-awareness campaigns, information days, workshops, school education and targeted outreach to vulnerable groups before and during heatwave periods.	Medium	Improves risk awareness, preparedness and appropriate behavior during extreme heat events.	Strengthens community engagement, public-health awareness and support for elderly people, children, socially isolated individuals and people with chronic illnesses.	Short term and recurring	Region of Attica, Municipalities, schools, health and social-care services, voluntary organizations	Behavioral change may be temporary; effectiveness depends on message accessibility, repeated engagement and the capacity of local support networks.
River flooding	Flood-protection works, including stream regulation, check dams or grade-control structures, drainage infrastructure, retention basins and local flood-storage measures.	High	Reduces flood depth, flow velocity and potential damage to population, buildings and infrastructure.	Improved drainage, protection of transport networks and reduced economic losses.	Medium to long term	Region of Attica, Municipalities, Ministry of Infrastructure, water authorities	Residual risk remains during events exceeding design standards; possible environmental impacts and high capital costs.
River flooding	Climate-proofing and upgrading of existing drainage and stormwater networks using future climate projections.	High	Increases infrastructure capacity and reduces system failure during intense rainfall events.	Improves infrastructure reliability and supports long-term investment planning.	Medium to long term	Region of Attica, Municipalities, utilities and infrastructure authorities	Uncertainty in future rainfall extremes, space constraints in dense urban areas and high implementation costs.
River flooding	Nature-based flood-management measures, including urban green areas, permeable surfaces, stream restoration and retention landscapes.	Medium	Reduces surface runoff and supports local water retention.	Urban cooling, biodiversity enhancement, improved public space and groundwater recharge.	Medium to long term	Municipalities, Region of Attica, planning and environmental authorities	Limited effectiveness during very extreme events; requires sufficient land and appropriate maintenance.
River flooding	Development of flood monitoring, early warning and operational	High	Supports earlier warning, situational awareness,	Improves inter-agency coordination, supports multi-	Medium term	Region of Attica, Ministry for Climate	Depends on real-time data availability, forecasting

Key climate risk	*CRM measure*	*Effectiveness / Risk reduction (high, medium, low)*	*Contribution to CRM objectives*	*Possible co-benefits*	*Timeline (short, medium, long term)*	*Responsible organization*	*Possible adaptation limits*
	preparedness systems connected to 112, EFAS, Copernicus EMS, national warning systems, local hydrometeorological information and the proposed Civil Protection operational center.		resource mobilization, emergency response and protection of exposed communities and infrastructure.	hazard emergency management and strengthens the operational use of European project outputs, such as MedEWSa and GOBEYOND.		Crisis and Civil Protection, Municipalities, Civil Protection authorities, HNMS, NOA, scientific institutions	uncertainty, interoperability, staff capacity and communication reliability.
River flooding	Integration of flood-risk maps, CLIMAAX outputs, vulnerability indicators and post-disaster data into spatial planning, feasibility studies, Local Adaptation Plans and the design of new infrastructure or buildings.	High	Avoids new exposure in flood-prone areas and supports climate-resilient investment decisions and prioritization through risk assessment, cost-benefit analysis and climate scenarios.	More transparent planning, reduced future damage, better protection of critical infrastructure and improved use of post-disaster data, such as affected businesses, damaged buildings, compensation payments and recovery needs.	Medium term	Region of Attica, Municipalities, planning authorities, technical services, private developers, Civil Protection authorities	Existing land-use pressures, limited space in dense urban areas, data gaps and implementation complexity may restrict effectiveness.
River flooding	Public awareness campaigns, self-protection guidance, workshops, school education, preparedness exercises and support for evacuation or mobility of vulnerable groups in flood-prone areas.	Medium to high	Improves preparedness and reduces risk to residents, businesses and people with limited mobility or lower coping capacity in flood-prone zones.	Strengthens community engagement, trust in warnings, social resilience and local emergency preparedness.	Short term and recurring	Region of Attica, Municipalities, Hellenic Police, EKAB, emergency services, social-care services, voluntary organizations	Behavioral change may be temporary; effectiveness depends on repeated engagement, message accessibility, available transport, updated registries and trained personnel.

CRM measures combine hazard-specific interventions with cross-cutting governance, data, capacity-building and social-preparedness actions. For wildfires, the focus is on prevention in wildland-urban interface areas, operational preparedness, early warning and protection of evacuation routes and critical infrastructure.

For heatwaves, measures combine immediate protection of vulnerable groups with longer-term reduction of urban heat exposure through cooling spaces, urban greening and climate-proofing of buildings. The emphasis on vulnerable groups, heat-risk indicators, cooling spaces and urban greening is consistent with studies showing that high-resolution heat vulnerability assessments can support local adaptation planning and targeted heat-risk reduction (*Maragno et al., 2020; Sestito et al., 2025*).

For river flooding, measures combine grey infrastructure, such as flood-protection works and drainage upgrades, with nature-based solutions and climate-proofed spatial and infrastructure planning. The inclusion of nature-based flood-management measures is supported by recent literature showing that NbS can contribute to urban flood-risk reduction while also generating social, ecological and governance co-benefits *(Huang et al., 2020; Zhou et al., 2024)*.

From an equity and justice perspective, CRM should prioritize people and areas with higher vulnerability or lower coping capacity, including elderly people, children, people with chronic illnesses, socially isolated individuals, people with limited mobility, residents of overheated urban districts, communities in wildland-urban interface areas and residents or businesses in flood-prone zones. Investment prioritization should combine spatial risk information, climate scenarios, cost-benefit analysis, feasibility, maintenance needs and adaptation limits, so that adaptation benefits are directed to the areas and population groups where needs are greatest.

3.4 Integration into planning and decision making

The CLIMAAX results provide quantitative and spatial information that can be integrated into regional, municipal and sectoral planning instruments. At regional level, the main entry point is the Regional Climate Change Adaptation Plan, where climate scenarios, hazard maps and vulnerability indicators can support the updating, implementation and evaluation of adaptation measures *(Region of Attica, 2022)*.

The outputs can also support Disaster Risk Management Plans by enabling more accurate spatial prioritization of high-risk areas. Wildfire risk maps can inform firebreaks, vegetation clearance, water-supply infrastructure and evacuation-route planning. Heatwave outputs can identify overheated urban areas and vulnerable population groups requiring targeted support. Flood outputs can inform the prioritization of flood-protection works, drainage upgrades and preparedness measures in areas where hazard overlaps with exposed population, assets and infrastructure *(General Secretariat for Civil Protection, 2022; General Secretariat for Civil Protection, 2023; Hellenic Ministry of Environment and Energy, 2025)*.

At municipal level, CLIMAAX outputs can support local adaptation plans, municipal Civil Protection plans, preparedness procedures and technical programs. They can also inform spatial planning and land-use decisions, including the avoidance of new exposure in flood-prone areas, the planning of emergency access in wildland-urban interface zones, and the prioritization of greening, shading and public-space interventions in overheated urban areas.

Future investment decisions should integrate climate-risk information from the design stage. Transport, water, energy, health, social-care, public-building and infrastructure investments should be assessed against risk maps, climate scenarios and cost-benefit analysis, so that new assets are climate-proofed and do not increase future vulnerability.

Synergies and tensions for CRM

The integration of CLIMAAX outputs into planning creates important synergies across climate adaptation, Civil Protection, spatial planning, infrastructure planning, public health and municipal operations. A common spatial evidence base can help regional and municipal authorities identify priority areas, coordinate interventions, avoid duplication of effort and justify investments using comparable risk information. This is particularly important for multi-hazard planning, as the same datasets and GIS-based tools can support decisions for heatwaves, wildfires and river flooding.

Important synergies can also be created between technical works and nature-based solutions. For example, flood-protection works can be combined with stream restoration, permeable surfaces and retention landscapes; heatwave management can combine cooling spaces with urban greening, shading and climate-proofing of public buildings; and wildfire prevention can combine fuel-load management with improved access routes, water-supply points and early-warning systems. These synergies can support both risk reduction and wider co-benefits, including public health, biodiversity, social well-being, air quality and infrastructure resilience.

However, several tensions and implementation challenges remain. Climate Risk Management in Attica involves many actors operating at different governance levels, including the Region, municipalities, national authorities, emergency services, infrastructure operators, scientific bodies and local communities. This creates coordination challenges, especially when responsibilities, datasets, technical capacities and funding sources are fragmented. Differences in technical capacity between municipalities may also limit the ability to use CLIMAAX outputs consistently for local planning and preparedness.

Additional tensions may arise between long-term adaptation needs and short-term operational priorities. Civil Protection mechanisms are often focused on immediate preparedness and emergency response, while adaptation planning requires long-term investments, land-use decisions, infrastructure upgrades and behavior change. There may also be tensions between development pressures and the need to restrict or climate-proof activities in high-risk areas, particularly in flood-prone zones or wildland-urban interface areas.

To improve CRM, the Region can strengthen common data-sharing procedures, unified GIS standards, regular coordination between regional and municipal services, and annual updating of emergency and adaptation plans based on new risk information. Staff training in risk modelling, GIS, indicators and the use of CLIMAAX outputs is also essential, particularly for municipalities with limited technical resources. Clear governance arrangements can help ensure that risk information is translated into responsibility, action and monitoring.

New data and remaining needs

The CLIMAAX project has produced new spatially explicit data and risk outputs for heatwaves, wildfires and river flooding. These outputs strengthen the evidence base available to the Region of Attica by providing high-resolution risk maps, vulnerability indicators and spatial information that can support prioritization, planning and investment decisions. The Region has also identified the

need to produce new high-resolution risk maps, integrate risk and vulnerability indicators into regional and local adaptation plans, develop a regional climate-risk data hub and support municipalities in the use of CLIMAAX tools for local planning.

Nevertheless, further data and capacities are needed to improve the understanding and management of climate risks. For wildfires, additional real-time micro-meteorological data, updated fuel-load information, vegetation condition monitoring, evacuation-route information and data on critical infrastructure exposure would improve operational preparedness. For heatwaves, further local heat-stress monitoring, urban microclimate data, building-level vulnerability data and information on vulnerable population groups would support more targeted heat-health actions. For river flooding, updated hydrological and hydraulic data, drainage-network capacity information, stream-maintenance records, infrastructure exposure data and event-loss databases would improve flood-risk modelling and prioritization of works.

In addition to data, the Region and municipalities need sustained resources, technical competencies and institutional procedures. This includes staff capacity in GIS, climate-risk modelling, use of climate projections, interpretation of hazard, exposure and vulnerability indicators, cost-benefit analysis and monitoring of adaptation progress. Improved interoperability between regional, municipal and national datasets is also necessary so that climate-risk information can be used consistently across planning, Civil Protection and technical services.

Additional research could further strengthen CRM in Attica. This includes research on local heat-health thresholds, social vulnerability patterns, behavioral response to warnings, cascading impacts on infrastructure, compound events and the effectiveness of implemented adaptation measures. Evaluation of past events and post-event damage data would also help to calibrate future risk models and improve cost-benefit analysis.

Monitoring and evaluation system

The Region of Attica has an existing and progressively developing monitoring and evaluation system for tracking progress towards its Climate Risk Management objectives. The system is centered on the Climate Change Observatory of Attica Region and on monitoring provisions included in the Regional Climate Change Adaptation Plan of Attica. These provisions foresee the establishment and further development of systems for monitoring spatial and sectoral vulnerability, environmental parameters and the implementation progress of the adaptation measures included in the Plan. The monitoring framework is expected to include indicators, databases, data collection and processing procedures, mechanisms for regularly updating indicator values and annual monitoring reports.

The Climate Change Observatory of Attica Region constitutes the main monitoring mechanism supporting the implementation of the Regional Climate Change Adaptation Plan. It operates as an online platform for collecting and presenting data on climate change impacts, as a mechanism for developing indicators to monitor and evaluate the progress of adaptation actions, as an access point to existing and future monitoring networks, and as a tool for informing and raising awareness among citizens and relevant stakeholders. The Observatory has already incorporated air-quality monitoring networks and the initial results of the high-spatial-resolution climate modelling developed under the Regional Climate Change Adaptation Plan.

The Regional Climate Change Adaptation Plan also provides for the development of systems to monitor spatial and sectoral vulnerability, evaluate the progress of adaptation measures, develop models for the evolution of climate change impacts across critical sectors and continuously collect

and process relevant environmental parameters. This system is intended to include indicators covering hazard, exposure and vulnerability, procedures for collecting and processing data, mechanisms for updating indicators as new data become available and annual monitoring reports.

A complementary monitoring arrangement has also been established through a cross-sectoral body under the Regional Climate Change Adaptation Plan, with the participation of relevant Directorates of the Region of Attica. Its main role is to monitor the implementation of the climate change adaptation measures included in the Plan. This arrangement can support coordination between services and strengthen the link between monitoring, planning and implementation.

For the purposes of CRM, the monitoring and evaluation system should progressively include indicators on exposed population, vulnerable groups, affected buildings, economic damages, infrastructure disruptions, coverage of early-warning systems, number of updated plans, number of preparedness exercises, implementation of risk-reduction measures and frequency of risk-map updates. Monitoring also includes qualitative information on institutional learning, coordination effectiveness, stakeholder engagement and the practical use of CLIMAAX outputs by municipalities.

The Region has an operational monitoring foundation through the Climate Change Observatory of Attica Region, complemented by a broader monitoring and evaluation framework that is still being developed. The progressive integration of CLIMAAX hazard, exposure and vulnerability indicators, environmental monitoring data and annual implementation reporting can support more systematic tracking of CRM objectives and adaptation progress. This will help ensure that Climate Risk Management in Attica remains an iterative process, where new data, lessons learned from events and monitoring results are regularly used to update plans, prioritize measures and improve preparedness.

4 Project Evaluation

4.1 Usability of the results

The AtticaReAdy project has significant practical value for the Region of Attica, as it provides a structured and spatially explicit evidence base for moving from Climate Risk Assessment to Climate Risk Management. The project developed new knowledge on the three priority climate risks examined during Phase 2 - heatwaves, wildfires and river flooding - and translated this knowledge into objectives, indicators, supportive elements and potential CRM measures during Phase 3.

A key benefit of the project is that it provides risk information in a form that can be used by regional and municipal authorities. The high-resolution risk outputs can support the identification of priority areas, exposed population groups, vulnerable infrastructure and locations where prevention, preparedness or adaptation measures should be prioritized. This makes the results useful not only for strategic planning, but also for operational preparedness, technical studies, investment planning and communication with municipalities and stakeholders.

The usability of the project is particularly important for the Region's existing policy and planning framework. The results can support the implementation and future revision of the Regional Climate Change Adaptation Plan, the improvement of Disaster Risk Management Plans, and the development of more targeted municipal preparedness and adaptation actions. They can also inform spatial planning and land-use decisions, especially in areas where climate risks overlap with dense urban development, critical infrastructure, transport corridors or vulnerable communities.

An important outcome of the project is the confirmation of previous findings and planning priorities already recognized at regional level. The AtticaReAdy results are consistent with the Regional Climate Change Adaptation Plan, Flood Risk Management Plans and lessons learned from major climate-related events *(Region of Attica, 2022; Hellenic Ministry of Environment and Energy, 2025; General Secretariat for Civil Protection, 2022; General Secretariat for Civil Protection, 2023)*. This consistency increases confidence in the results and facilitates their integration into existing planning and decision-making processes.

The results also have clear policy implications. They can support the integration of climate-risk information into feasibility studies, technical works and infrastructure projects, particularly in relation to flood-protection works, wildfire-prevention infrastructure, urban greening, cooling spaces and climate-proofing of public buildings and critical infrastructure. In this way, the project supports not only direct adaptation actions, but also the inclusion of climate adaptation components in future investments that would take place in any case *(Farinós-Dasí et al., 2025; Huang et al., 2020; Zhou et al., 2024)*.

Another important usability aspect is the support provided to municipalities. Municipalities are central actors in local preparedness, public information, cooling-space operation, local prevention measures and support to vulnerable groups. The project outputs can help municipalities better understand their local risk profile, identify priority areas and use a common evidence base when developing or updating local plans. This is particularly useful for municipalities with limited technical capacity or limited access to specialized climate-risk data.

The stakeholder engagement activities also showed that municipalities can use the results as a basis for reviewing and updating their local plans. During the workshop, participating municipalities

were informed about the project outputs and their potential use in local preparedness, adaptation planning and risk-management procedures. This strengthens the policy relevance of the project, as the results can support not only regional planning but also municipal-level revision of plans and prioritization of local actions.

The project also improves institutional learning and data use within the Region. It highlights the importance of common GIS standards, data-sharing protocols, risk-map updates, vulnerability indicators and a regional climate-risk data hub. These elements can strengthen coordination between the Region, municipalities, scientific bodies and operational authorities. The Region has already identified the integration of risk and vulnerability indicators into regional and local adaptation plans, the production of high-resolution risk maps, the development of a regional climate-risk data hub and support to municipalities in the use of CLIMAAX tools as important priorities for future planning.

The project is usable because it transforms climate-risk information into decision-support material. It helps the Region and municipalities move from general awareness of climate risks to more targeted, evidence-based prioritization of measures, investments and preparedness actions. Its main added value lies in connecting scientific outputs with practical planning needs, especially for Civil Protection, climate adaptation, spatial planning, infrastructure resilience and the protection of vulnerable groups.

4.2 Lessons learned

During the third phase of the project, the main lesson learned was that the transition from Climate Risk Assessment to Climate Risk Management requires more than the production of risk maps. Risk evidence must be translated into objectives, indicators, measures, responsibilities, planning mechanisms and monitoring arrangements. This translation process is essential if the results are to be used in policy and operational decision-making *(Greenham et al., 2024; Farinós-Dasí et al., 2025)*.

A second lesson is that climate-risk information is most useful when it is spatially explicit and directly connected to existing institutional responsibilities. The Phase 3 work showed that risk maps and indicators can support the prioritization of wildfire-prevention zones, flood-protection works, drainage upgrades, cooling spaces, vulnerable-group support and spatial planning decisions. However, the practical uptake of these outputs depends on whether regional and municipal services have the technical capacity, data access and institutional mandate to use them.

The most significant difficulties encountered during Phase 3 were related to the operationalization of risk information. While the project produced useful spatial evidence, turning this evidence into concrete CRM recommendations required assumptions about governance arrangements, available resources, municipal capacities and implementation pathways. Additional challenges relate to the need for more local, real-time and interoperable datasets, especially for micro-meteorological conditions, heat-stress monitoring, exposure of critical infrastructure, drainage capacity and local vulnerability.

Stakeholders played an important role in the evaluation, interpretation and potential policy uptake of the results. The workshop and feedback activities allowed regional services and municipalities to discuss how the CRM recommendations could be used in practice, including for the revision of local plans, preparedness procedures and future adaptation actions. The response of stakeholders was

generally positive, as the results were considered useful for improving risk understanding, supporting local planning and strengthening cooperation between the Region and municipalities.

The workshop questionnaire collected feedback from participating entities, including the Region of Attica and the municipalities of Megara, Paiania, Kropia and Vari-Voula-Vouliagmeni. The feedback confirmed the relevance of the risks examined and highlighted the need for continued use of the project tools, further workshops on the use of the tools, stronger collaboration with municipalities, use of real local data, modern and up-to-date datasets, remote sensing and further interaction between municipalities and the Region.

This feedback is important because it shows that stakeholders do not view the project only as a technical assessment, but as a basis for future cooperation and practical use. Municipalities and regional services need tools that are understandable, regularly updated and applicable to local planning. The request for continued use of the tools after the end of the program also indicates that learning should be maintained beyond the formal project period.

Learning is ensured through several mechanisms. First, the project created a common knowledge base on heatwaves, wildfires and river flooding. Second, it supported interaction between technical experts, regional services and municipalities. Third, it produced materials and recommendations that can be reused in future planning cycles. Fourth, the Climate Change Observatory of Attica and the monitoring provisions of the Regional Climate Change Adaptation Plan provide a basis for continued monitoring, updating of indicators and dissemination of information. The Region's monitoring system is expected to include indicators, databases, data-collection procedures and annual monitoring reports.

The final outcomes were communicated through the Phase 3 workshop, stakeholder feedback activities and dissemination material. The wider communication approach includes policy-oriented material, targeted information packages, articles, newsletters and stakeholder-oriented outputs designed to support the integration of AtticaReAdy findings into local and regional planning processes. The Phase 2 progress framework also identified the workshop, policy brief, information package, articles and newsletters as key communication and dissemination outputs for the project.

Several elements worked well. The project successfully created a common structure for linking hazard, exposure and vulnerability information with CRM objectives and measures. It also supported outward-looking communication and dissemination of results, making the findings more accessible to regional services, municipalities and stakeholders. The Phase 3 workshop helped communicate the results, explain their practical relevance and support discussion on how they can be used in local and regional planning. The project also helped clarify how the results can support the Regional Climate Change Adaptation Plan, Disaster Risk Management Plans, municipal plans, technical works and investment prioritization.

Some elements were more challenging. The main limitations relate to data availability, interoperability and differences in technical capacity across municipalities. In several cases, relevant data were difficult to identify or access at local level, especially where updated datasets on exposure, vulnerability, infrastructure condition or post-event impacts were not readily available. The use of high-resolution risk outputs also requires appropriate GIS capacity, updated local datasets and staff trained in risk interpretation. Capacity-building at municipal and local-community levels remains challenging, as municipalities often have limited staff, time and financial resources to participate in detailed risk-assessment processes or to translate technical outputs into operational

plans. Another challenge is that CRM measures often require long implementation timelines, sustained funding and coordination between several institutions.

The available resources were used efficiently by focusing on the three priority risks identified in Phase 2 and by linking the technical results directly with planning needs. The combination of regional staff, external technical support, stakeholder engagement and existing institutional mechanisms allowed the project to produce outputs that are relevant for both strategic and operational purposes. However, future implementation will require additional resources for municipal capacity-building, data updating, monitoring and the integration of risk outputs into plans and investments.

The impact of the CRM work is considered positive in terms of improved risk understanding, institutional capacity and investment readiness. The project has strengthened the Region's ability to identify where climate risks are concentrated, which groups and systems are most exposed, and which types of measures can reduce risk. It has also improved the basis for public awareness and stakeholder engagement by making climate-risk information more accessible and relevant to planning. Finally, it can support funding and investment decisions by providing evidence for prioritizing interventions in high-risk and high-vulnerability areas.

The main lesson from Phase 3 is that Climate Risk Management must be treated as a continuous process. The project provides a strong starting point, but its long-term value will depend on regular updates of risk information, continued stakeholder engagement, systematic monitoring, municipal support and the integration of climate-risk evidence into planning, investment and Civil Protection procedures.

5 Conclusions Phase 3

Phase 3 of the AtticaReAdy project focused on translating the Climate Risk Assessment results produced during Phase 2 into a practical Climate Risk Management framework for the Region of Attica. The phase built on the three priority climate risks identified for the Region - heatwaves, wildfires and river flooding - and examined how the available risk evidence can support objectives, indicators, measures, planning processes and monitoring arrangements.

The main conclusion of this phase is that the CLIMAAX outputs provide a useful and operationally relevant evidence base for regional and municipal decision-making. The spatial risk maps and indicators can support the identification of priority risk areas, exposed population groups, vulnerable infrastructure and locations where prevention, preparedness or adaptation measures should be prioritized. This is particularly important for Attica, where dense urban development, high population exposure, critical infrastructure and peri-urban interfaces increase the complexity of climate-risk management *(Greenham et al., 2024; Maragno et al., 2020)*.

The project also confirmed that Climate Risk Management should be understood as a continuous and multi-level process. Effective CRM cannot rely only on emergency response after an event has occurred. It requires prevention, preparedness, adaptation, monitoring, institutional coordination, public communication and investment prioritization. For this reason, Phase 3 developed CRM objectives and indicative indicators linked to exposure reduction, protection of vulnerable groups, reduction of expected damages, protection of critical infrastructure, improvement of Civil Protection preparedness and strengthening of knowledge and monitoring systems.

The key findings of Phase 3 show that the Region of Attica already has an important institutional and operational basis for CRM, including the Regional Climate Change Adaptation Plan, Civil Protection mechanisms, the Climate Change Observatory of Attica, Flood Risk Management Plans, operational plans for wildfires and floods, and cooperation with municipalities and scientific bodies. At the same time, the assessment highlighted the need to strengthen interoperability, common GIS standards, data-sharing procedures, staff training and regular updating of risk maps and operational plans (*Region of Attica, 2022; Hellenic Ministry of Environment and Energy, 2025; General Secretariat for Civil Protection, 2022; General Secretariat for Civil Protection, 2023)*.

The potential CRM measures identified during this phase include structural, non-structural, nature-based, human/social and governance-related actions. For wildfires, priority measures include firebreaks, fuel-load reduction, vegetation clearance, water-supply infrastructure, early warning and evacuation-route planning. For heatwaves, priority measures include cooling spaces, support networks for vulnerable groups, urban greening, shading, public-health preparedness and climate-proofing of buildings. For river flooding, priority measures include flood-protection works, drainage upgrades, retention measures, stream restoration, permeable surfaces and integration of flood-risk maps into spatial and infrastructure planning.

Another key conclusion is that CRM measures should not be limited to stand-alone adaptation projects. Climate adaptation should also be integrated into future public buildings, infrastructure projects, technical works, spatial planning decisions and investment programs. This is essential to avoid creating new exposure or vulnerability and to ensure that future investments are climate-resilient from the design stage.

Phase 3 also highlighted the importance of justice and equity. Climate risks do not affect all groups equally. Elderly people, children, people with chronic illnesses, socially isolated individuals, people with limited mobility, outdoor workers, residents of overheated urban areas, communities in wildland-urban interface zones and residents or businesses in flood-prone areas require targeted consideration. The CRM framework should prioritize not only the areas of highest physical risk, but also the people and communities with lower coping capacity (*Maragno et al., 2020; Sestito et al., 2025*).

Stakeholder engagement provided useful feedback on the practical value and future use of the project results. The workshop feedback underlined the need for continued use of the tools after the end of the program, further workshops on the use of the tools, stronger collaboration with municipalities, use of real local data, modern and up-to-date datasets, possible future use of remote sensing, and stronger interaction between municipalities and the Region.

Several challenges were addressed during Phase 3, including the translation of technical risk outputs into CRM objectives, measures and planning recommendations, and the connection of risk information with existing policy and operational mechanisms. However, some challenges remain. These include the need for more real-time and local data, improved micro-meteorological and heat-stress monitoring, better exposure and infrastructure datasets, updated information on vulnerable groups, stronger municipal technical capacity, sustained funding and systematic integration of risk outputs into formal planning procedures.

The Region has already identified several important next steps, including the integration of risk and vulnerability indicators into regional and local adaptation plans, the production and updating of high-resolution risk maps, the development of a regional climate-risk data hub, support to municipalities in the use of CLIMAAX tools and prioritization of projects based on cost-benefit analysis and climate scenarios. The existing and developing monitoring framework, centered on the Climate Change Observatory of Attica and the monitoring provisions of the Regional Climate Change Adaptation Plan, can support the tracking of CRM objectives through indicators, data-collection procedures and annual reports.

Phase 3 demonstrates that AtticaReAdy has strengthened the Region's capacity to move from climate-risk assessment to climate-risk management. Its main added value lies in providing a common evidence base for planning, preparedness, stakeholder engagement and investment prioritization. The long-term impact of the project will depend on the continued use of the CLIMAAX outputs, regular updating of risk information, integration into regional and municipal plans, support to municipalities and systematic monitoring of adaptation progress (*Region of Attica, 2022; Greenham et al., 2024*).

6 Progress evaluation

6.1 Project outputs

Table 6-1: Overview key performance indicators

Key performance indicators	*Progress*
At least two workflows successfully applied during Phase 1	**Completed during Phase 1**. The river flooding and wildfire workflows were successfully applied and provided the basis for further analysis.
At least two workflows successfully applied during Phase 2	**Completed during Phase 2**. The river flooding, wildfire and heatwave workflows were applied and used as the technical basis for Phase 3 CRM work.
Community of Practice (CoP) with key institutions / authorities / associations participating in the core group and stakeholder list updated	**Implemented and further supported during Phase 3.** The Community of Practice consisted of representatives from the Region of Attica, the Municipality of Piraeus, the Municipality of Vyronas, the Municipality of Vari-Voula-Vouliagmeni, and the Volunteer Forest Fighters and Rescuers of Ekali, a non-governmental organization. During Phase 3, the Community of Practice and the broader stakeholder-engagement activities supported the interpretation and dissemination of the project results, as well as discussions on their practical application in climate-risk management, preparedness and local planning.
Workshop targeted to administration and policy makers for the presentation and use of Phase 2 results (Officers and policy makers representing at least 8 municipalities and at least 50 participants)	**Implemented during Phase 3.** The workshop was organized on 15 June 2026 with regional and municipal stakeholders and supported the presentation and discussion of Phase 2 and Phase 3 results.
Regional Climate Adaptation Factsheet / information package (150 copies distributed to the 66 municipalities)	**Implemented during Phase 3.** The information package supports the communication of project results to regional and municipal stakeholders and can be used to raise awareness and support local planning.
Note for policy makers (100 copies distributed to the 66 Municipalities)	**Implemented during Phase 3.** The note supports the translation of technical risk evidence into planning, adaptation and policy recommendations.
3 Articles on the website of the region and the Climate Adaptation Observatory of Attica (1 to announce the project start, targets and potentialities; 1 with the first results; 1 with the final results and workshop attendance)	**Implemented during Phase 3.** Articles were used to communicate the project objectives, initial findings and final results, including the workshop and the outcomes of Phase 3. Three significant articles were published on the website of the Region. **The first article** announced the start of the project, presenting its objectives, potential benefits and initial results. **The second article** focused on the first results of the project, while **the third article** presented the final results and reported on the workshop participation. Supporting document: Official website_CLIMAAX-AtticaReAdy
2 Newsletters informing the 66 municipalities of the Region about the	**Implemented during Phase 3.** Newsletters were used to communicate the project results to municipalities, including the

Key performance indicators	*Progress*
results of the project / Feedback from municipalities and stakeholders.	results of Phase 2 and the findings of Phase 3. The first newsletter was sent on 3 June 2026, while the second newsletter was sent on 23 July 2026. In addition, feedback from municipalities and stakeholders was collected through the workshop questionnaire and the stakeholder engagement process. The feedback confirmed the relevance and usefulness of the tools and highlighted the need for their continued use, stronger cooperation with municipalities, integration of local data and further training.

Table 6-2: Overview milestones

Milestones	*Progress*
Mil 1: Report on scoping	**Achieved** during the previous reporting period, by the end of 2024. The scoping work provided the basis for identifying priority climate risks and structuring the subsequent assessment.
Mil 2: Stakeholder meeting	**Achieved** during the previous reporting period through bilateral meetings and further supported during Phase 3 through workshop activities and feedback collection.
Mil 3: Attend the CLIMAAX workshop held in Barcelona mid2025.	**Achieved**.
Mil 4: Production of policy brief and information package	**Implemented during Phase 3.** Policy-oriented and stakeholder-oriented material was prepared to support dissemination and uptake of the results.
Mil 5: Workshop for presenting results	**Implemented during Phase 3.** The workshop supported the presentation of project results, discussion of CRM recommendations and collection of stakeholder feedback.
Milestone 6: Attendance at CLIMAAX workshop in Brussels	**Planned for a later stage of the project timeline,** outside the current M22 reporting period. Progress should be updated once the event has taken place.

7 Supporting documentation

Output category	Output / document	Description	Zenodo URL
Main Report	Phase 3 Deliverable - Climate Risk Management for the Region of Attica	Main Phase 3 report presenting CRM objectives, supportive elements, potential measures, integration into planning and decision-making, project evaluation, conclusions and progress evaluation.	-
Stakeholder engagement	KPI 4 / MIL 5 - Workshop & Newsletter Questionnaire and Feedback Results, Invitation, Agenda, Presentation Materials and Photographs	Documentation of stakeholder feedback collected in relation to both the Phase 3 workshop and the accompanying Newsletter. The questionnaire captured participants' views on the relevance, clarity and usability of the presented results, as well as their suggestions for future application and communication. Participating stakeholders included representatives from the Region of Attica and municipalities. The documentation package includes the workshop invitation, which also provided access to and promoted the newsletter, together with the agenda, presentation materials, CRM recommendations, discussion materials, feedback results and photographs.	https://l1nq.com/1ef03rg
Communication Outputs	KPI 5 / MIL 4 - Regional Climate Adaptation Factsheet / information package	Stakeholder-oriented information material summarizing the project, the priority risks, key findings and relevance for regional and municipal planning.	https://l1nq.com/0arzjdh
Communication Outputs	KPI 6 / MIL 4 - Note for policy makers / policy brief	Policy-oriented document translating technical risk evidence into planning, adaptation and decision-making recommendations.	https://sl1nk.com/qomnx3o
Communication Outputs	KPI 7 - Articles / web announcements	Articles or web communication material prepared for publication through the Region and/or the Climate Adaptation Observatory of Attica, covering the project objectives, results and final outcomes.	https://sl1nk.com/n2djrhy
Communication Outputs	KPI 8 - Newsletters to municipalities	Newsletter material was developed to communicate the project's key results to the 66 municipalities of the Region of Attica. It presented the main findings of Phase 2, the CRM outcomes of Phase 3, and the feedback collected from relevant stakeholders. The accompanying questionnaire gathered participants' views on the relevance, clarity and practical usability of the information presented, together with suggestions for its future application and communication. Contributors included representatives of the Region of Attica and participating municipalities.	https://sl1nk.com/gvr3zsm

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