



Deliverable number D.T.2.2

## PILOT REPORT

Activity A.2.2: Pilot Coordinators (PP 3, 6, 7, 8, 10, 11, 12) will implement the pilots with their local partners. Intermediate feedback on pilots will be shared among PPs during a half-day progress sharing workshop coordinated by WPL.

Pilot coordinators will assess and report the final results of pilots and organize at least one regional dissemination event and one testimonial video from policy-makers.

WPL will organize one webinar to share the pilot results among PPs.  
Contribution of all PPs.

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April, 2025

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## DOCUMENT CONTROL SHEET

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Short Description
<p>ADAPTNOW will work on strengthening the adaptive capacity of HAET by implementing and evaluating the available climate adaptation and risk mitigation management tools and practices, assessing the Climate Adaptation Plans and developing Climate Services to support the territories and their local public authorities. Ultimately, ADAPTNOW aims at making risk and adaptation planning more integrated, collaborative and inclusive. This will be reached through a more dynamic, agile and participatory planning process in which all local stakeholders need to be involved.</p>

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# CONTENT

- Abbreviations ..... 8
- 1. Introduction..... 9
- 2. Overview..... 10
- 3. Report about Pilot Plans..... 11
  - Region 1 | Grenoble-Alpes Métropole..... 11
    - Pilot Plan a ..... 11
    - Pilot Plan b..... 14
    - Pilot Plan c ..... 16
  - Region 2 | Pusteria Valley ..... 18
    - Pilot Plan a ..... 18
    - Pilot Plan b..... 23
  - Region 3 | Municipality of Chivasso, Piedmont Region (IT)..... 28
    - Pilot Plan a ..... 28
    - Pilot Plan b..... 40
  - Region 4 | City of Kempten ..... 43
    - Pilot Plan a ..... 43
    - Pilot Plan b..... 46
  - Region 5 | Plan B Region..... 48
    - Pilot Plan a ..... 48
    - Pilot Plan b..... 52
  - Region 6 | Pilot Selnica, Podravje region, Slovenia..... 55
    - Pilot Plan a ..... 55
    - Pilot Plan b..... 60
  - Region 7 | Genoa, Italy..... 67
    - Pilot Plan a ..... 67
    - Pilot Plan b..... 69

# Abbreviations

CA	Climate Adaptation
CSS	Climate Support Service
LP	Lead partner
PL	Pilot
PP	Partner
RP	Reporting Period
RM	Risk mitigation
TT	target territory
WP	Working Package
WPL	WP leader

# 1. Introduction

As stated in the project proposal, the objective of this deliverable (D2.2) is to report on the implementation of pilot actions in the seven regions..

Pilot Coordinators (PP 3, 6, 7, 8, 10, 11, 12) will implement the pilots with their local partners.

Intermediate feedback on pilots will be shared among PPs during a half-day progress sharing workshop coordinated by WPL. Pilot coordinators will assess and report the final results of pilots and organize at least one regional dissemination event and one testimonial video from policy-makers. WPL will organize one webinar to share the pilot results among PPs. Contribution of all PPs.

The pilot report contains the objective of the pilot, hazards, sectors, tools, practices and the methodology to improve planning process and project results and includes recommendations for other regions.

## 2. Overview

Partner	Pilots Location	Pilot coordinator (within consortium)	Pilot support	Pilot action 1/2	Description of Pilot action	Hazards	Sectors	Date of Implementation
1	Grenoble-Alpes Métropol (F)	GAM	AURA-EE, IRMa and municipalities	1	Animation of a working group with municipalities on the topic of municipal information documents on major risks through Risk and Resilience Community	Floods, rock falls, landslides, wildfires, flash floods	Populations exposed to natural risks, including urban infrastructure.	Year 2024/2025
				2	Involve municipalities in a workshop with ClymaStory tool	Floods, rock falls, landslides, wildfires, flash floods	Forestry, urban infrastructure, tourism and health	Year 2024/2025
				3	Serious Game Methodology	Heavy rains/floods, gravitational/landslides and wildfires	Urban infrastructure	Year 2024/2025
3	Pusteria Valley (IT)	EURAC Research	LAG Regional Management, Pusteria Valley as Observer	1	Training foresters in the Pusteria Valley (South Tyrol) to enhance their knowledge and capabilities regarding future climate risks and adaptation measures in forestry.	Gravitational hazards, heavy precipitation, temperature increase, drought periods	Mainly forestry with support of adjacent sectors such as agriculture, tourism, nature conservation, spatial planning, and civil protection;	Year 2024/2025
				2	Roadmap for enhancing climate change adaptation in the tourism sector of the Pusteria Valley	Increased temperatures, extreme weather events, and the resulting impacts on natural attractions and tourism infrastructure	Tourism, including winter and summer outdoor recreational activities, hospitality services, and destination management;	Year 2024/2025
6	Municipality of Chivasso, Piedmont Region (IT)	iISBE Italia R&D	City of Turin, Piedmont Region, Polytechnic of Turin, Chamber of Architects,	1	Development of a "climate resilient" Master Plan, including adaptation measures to climate change.	Heatwaves, draught, heavy rainfall, floods	UI: railway, main roads, building sector	Year 2024/2025
				2	Strengthening the skills of municipal planners and decision makers regarding the procedures for integrating adaptation	Heatwaves	Urban Infrastructure	Year 2024/2025
7	City of Kempten (D)	Energy and Environmental Centre Allgaeu (eza)	Energy and Environmental Centre Allgaeu (eza)	1	Sun Detectives and Heat awareness raising campaign July 2024	Heatwaves, Heavy Rain	Urban Infrastructure, Health	Year 2024
				2	Model project for facade greening in cooperation with university of Stuttgart and Fraunhofer Institute;	Heat waves and coping with overheating in the city, loss of biodiversity;	Urban Infrastructure	Year 2024/2025
8	Plan B Region (A)	Energy Institute Vorarlberg	EIV	1	Training programme for kindergartens and schools to make children aware of overheating in buildings and to implement practicable measures against overheating in consultation with building	Heatwaves	Building sector	Year 2023/2024
				2	Natural hazard check in two of the seven municipalities	Gravitational hazards, heavy precipitation, heatwaves;	Urban Infrastructure, Health	Year 2024/2025
9	Selnica, Podravje region, (SI)	ENERGAP	Municipality Selnica ob Dravi, Regional Development Agency of Podravje Region,	1	Identification of risks in the region, evaluate the vulnerability and to map potentially risky areas.	Heavy precipitation and gravitational hazards and landslides;	Infrastructure (mainly roads, drinking water supply, houses)	Year 2023/2025
				2	Greening the public spaces for reducing the temperature during the heat waves;	Heat Waves, Heavy Precipitation	Health of citizens, tourism	Year 2023/2025
10	Genoa (IT)	Municipality of Genoa	IRE Liguria	1	Research of hazard related to windstorms, seastorms, heat/cold waves in order to produce hazard maps.	Windstorms, Seastorms, Heatwaves, Cold Waves	Urban Infrastructure; Health; Tourism	Year 2023/2025
				2	High resolution wind model in the urban area	Windstorms	UI, Tourism, Health;	Year 2023/2026

Fig.1

# 3. Report about Pilot Plans

## Region 1 | Grenoble-Alpes Métropole

Pilot Location: Grenoble-Alpes Métropole

Pilot Coordinator: Grenoble-Alpes Métropole

Pilot Support: AURA-EE, IRMa and municipalities

### Pilot Plan a

**Describe the first pilot action you have implemented:**

Animation of a working group with municipalities on the topic of municipal information documents on major risks through Risk and Resilience Community:

- Propose risk maps specific to each municipality
- Share experiences between municipalities with the help of the metropolis
- Develop content explaining the effects of climate change on risks on the Grenoble-Alpes Métropole territory
- Develop content explaining the role of local actors in crisis management
- Lead the workshop with municipalities



*Field trip (30th June 2023) as part of the "pooling, risks and resilience" group*

**Hazards:**

All hazards identified on our territory: floods, rock falls, landslides, wildfires, flash floods...

### **Sectors:**

Through this action, we want to target populations exposed to natural risks, including urban infrastructure.

### **Adaption Measures:**

The action will lead risk mitigation and climate adaptation measures.

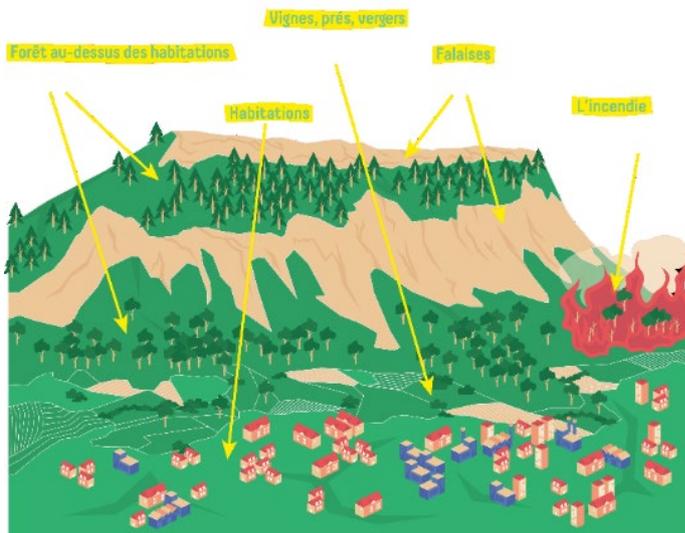
### **How did you implement the pilot action?**

- Provide workshops spread over half days in which Grenoble-Alpes Métropole and the municipalities are involved.
- Exchange about their experiences and their needs. The first meeting took place the 25th of January, the next meeting will take place the following spring or autumn

### **Have you achieved the desired goal with the implementation of the pilot action?**

Through this pilot action, we wanted to gather municipalities and allow them to exchange about their respective experience in building a Municipal Information Document on Major Risks. From the exchanges held the 25th of January 2024 we proceeded to give an online drive access to stakeholders to share their document and to construct short texts which can be added to their official documents dealing with the influence of climate change on natural risks and the risk stakeholders:

- The influence of climate change on natural risks on Grenoble-Alpes Métropole territory: Our climate slowly shifts toward a Mediterranean climate, increasing drought episodes and annual temperatures, thus strengthening wildfire hazard. On the other hand, the predominance of a Mediterranean climate reinforces heavy rains episodes during autumn, causing flash floods within hillsides areas, and floods of Drac river.



*Scheme showing the protection forest's role against rock falls*

- The risk actors in Grenoble-Alpes Metropole territory: distinguishing roles of municipalities, Grenoble-Alpes Metropole and Isère Prefecture related to risks' management.



## Pilot Plan b

### **Describe the second pilot action you have implemented:**

Involve municipalities in a workshop with ClimaStory tool:

- Introduce the tool to the municipalities
- Test the tool in order to: Build the action plan for a municipality and strengthen cooperation between different actors of the territory through a thematic approach: agriculture, industry, biodiversity.



*Presentation of tools*

### **Sectors:**

All topics: Forestry, urban infrastructure, tourism and health

### **Hazards:**

Inform the local population about risk on the territory.

### **Adaption Measures:**

Improvement of Civil Protection Plan, Improvement of wind monitoring and forecasting, reduction of preventive closures in favour of more specific actions.

### **How did you implement the pilot action?**

- Introduce different existing tools to involve the population on risk and climate change
- Set up half-day workshops during which participants use Climastory and provide feedbacks. The first workshop will take place the 9th of February.
- Improve the tool with the feedbacks.

### **Have you achieved the desired goal with the implementation of the pilot action?**

The aim of ClimaSTORY workshops was to test AURA-EE's tool and provide details to municipalities about climate adaptation measures.

ClimaSTORY tool was tested the 9<sup>th</sup> of February through a Risk and Resilience community workshop. Thus, 7 municipalities tested the tool during the afternoon.

Finally, we undertook an experience feedback workshop after the 21<sup>st</sup> of May session, to provide enhancement on ClimaSTORY. This last session allowed us and AURA-EE to evaluate the tool and the way it was received by the stakeholders. This final workshop permitted to identify solutions to enhance ClimaSTORY:

- Designing the tool on a real territory
- Orienting the players on specific programs and funding to undertake the solution identified during the sessions.



*Experience feedback on ClimaSTORY after the 21st of May 2024 test workshop with risks and resilience community*

### **Which recommendations can you give to other regions?**

We would have tried to gather more municipalities for the improvement of the tool, to get as many points of view as possible in order to enhance for the better ClimaSTORY for future iterations.

## Pilot Plan c

### **Describe the third pilot action you have implemented:**

The inter-municipal solidarity focuses on means sharing in period of crisis between municipalities and between GAM and municipalities, when their respective means are overwhelmed. With this final pilot, we wanted to help municipalities appropriate the inter-municipal solidarity notion related to the Inter-Municipal Safeguard Plan, through a serious game methodology. The serious game methodology is designed to be animated in two different ways:

- Spreadsheet method: players enter their responses on an online Excel file, it is designed for fourteen players, and for an animation in videoconference
- Voting application method: players use an online survey (Klaxoon) to enter their answers; it is designed for a larger number of participants, and is preferably used in-person.

Each way is mended to teach players on how to request additional means from the inter-municipality or other municipalities.

The serious game is a succession of hazard impacts where the stakeholders must respond by deploying municipal employees and vehicles on the field. The game is based on two unspoken questions that players must answer in each turn: “Am I entitled to intervene (GAM competence vs municipal competence)?” & “Am I able to intervene?” The players have fewer resources to intervene as more turns pass. When participants consider that they can no longer respond to the situation by their own means, they decide to call on the resources of other municipalities or GAM.

### **Hazards:**

Heavy rains/floods, gravitational/landslides and wildfires

### **Sectors:**

Urban infrastructure

### **Adaption Measures:**

The action will lead risk mitigation.

### **How did you implement the pilot action?**

- Game design:
  - Response system: Stakeholders enter their responses on a drive spreadsheet or on a voting application, each response engaging a predefined number of resources (vehicles and employees).
  - Scenarios: We created six crisis scenarios divided in three categories: floods, flash floods and wildfire; Each scenario takes place on a fictive territory represented by two municipalities, each municipality with its own resource reserve;
- Animation: We used power point as support to explain the rules and display the scenario. Each turn, the players entered their response on the drive spreadsheet or the voting application. Both of the method allowed them to see their resources’ evolution as the game progresses, and allowed us to follow their answer in order to give explanations at each turn.

- Each turn, the players entered their response on the drive spreadsheet. It allowed them to see their resources' evolution as the game progresses, and allowed us to follow their answer in order to give explanations at each turn.
- Some municipalities participated as a group during municipal council session.

**Have you achieved the desired goal with the implementation of the pilot action?**

The serious game sessions involved both employees and elected, thus we achieved to raise awareness on the new tool that is inter-municipal solidarity.

Six sessions took place with the spreadsheet method:

- 16/10/2024: floods
- 14/11/2024: flashfloods
- 18/11/2024: wildfire
- 23/01/2025: flashfloods
- 12/02/2025: wildfire
- 18/02/2025: flashfloods

Those sessions involved both employees and elected, thus we achieved to reach over 50 people. Some municipalities participated as a group during municipal council session.

Two sessions with the voting application took place: the first with GAM employees, gathering around 10 stakeholders and the second during the regional event the 13th of March, gathering 25 stakeholders.



*First serious game workshop dealing with floods, the 16<sup>th</sup> of October 2024*

**Which recommendations can you give to other regions?**

We would have liked to push the serious game system further, particularly through a board game or a web site. The first solution would have allowed us to better interact with the stakeholders and better explain the solidarity mechanisms. The second one could have ensured a continuous training available on internet without human animation.

## Region 2 | Pusteria Valley

Pilot Coordinator: Eurac Research

Pilot Support: LAG Regional Management, Pusteria Valley as Observer

### Pilot Plan a

#### **Describe the first pilot action you have implemented:**

Within the first pilot action, the focus was on training foresters in the Puster Valley (South Tyrol) to enhance their knowledge and capabilities regarding climate resilient, targeted reforestation in the light of future climate risks and necessary adaptation measures in forestry – reinforced by acute need for action due to current calamities and the prevailing strategy of almost purely natural rejuvenation. An absence of a provincial forest owners' association made direct training of forest owners challenging, therefore, a "train the trainers" approach was chosen. In the province of South Tyrol, every forest-related intervention has to be signed off by the provincial forest-administration, which is organized in a number of regional forest inspectorates (two of them in the Puster Valley) and local forest offices. The foresters do therefore serve as primary contact points for forest owners and thus serve as the fundamental multipliers when it comes to introducing adaptation measures in forest management.

The main goal of the training was to develop a profound understanding of the climate-related challenges and knowledge enhancement in the field of targeted, climate-adapted reforestation. The overall thematic orientation of the workshop and the rough structure were elaborated in close and permanent collaboration with the provincial forest offices and the local forest inspectorates in order to guarantee tailored and practically relevant outputs. Thematic experts from across the alps were identified and invited during the detailed planning phases of the workshop. In the end, the commonly agreed training structure includes a theoretical block and a practical part, where the theoretical knowledge will be applied in chosen, representative forest site in the area.

Theoretical part (approx. 4 hours)	Practical part (approx. 3 hours)
Climate change and forest-related extreme events	Information and discussion of site conditions
Climate scenarios for the Puster Valley	Applied group works (with group change): <ul style="list-style-type: none"> <li>• Strategic discussions along the guiding questions about reforestation</li> <li>• Field work: Practical implementation of planting techniques and protective measures against wildlife browsing</li> </ul>
Climate risks in the forest sector	
Climate analogies – future potential tree species composition (external expert from LWF Bavaria)	
Experiences in climate resilient reforestation and strategical (guiding) questions (external expert from ibW Switzerland)	
Applied reforestation aspects and planting techniques (external expert from a forest tree nursery in Switzerland)	

The workshop was organized as an obligatory training course for the foresters in the Puster Valley. Two separate, identical workshops were conducted in October 2024 to reach the in total approx. 50 foresters of the Valley. In addition, did representatives of various provincial forest offices take place, as well as the heads of the forest operational workers. A feedback round at the end of the workshop allowed us to collect not only impressions from the workshop itself, but also the need for consolidation, further trainings and instruments as well as the practical relevance for the everyday consulting activities of the foresters.

In the follow-up period of the workshop, we collected and processed the materials, distributed them to the participants of the workshop and also to the provincial forest offices in order to apply them also in other parts of the province.

### **Hazards:**

'Main hazards: gravitational hazards, heavy precipitation, temperature increase, drought periods

Within the pilot action, we identified region-specific climatic hazards by downscaling climate models to the regional provincial level. The prevailing hazards include altered precipitation patterns with more frequent heavy rain events, related extreme weather events with respective gravitational hazards, a general temperature increase with more frequent heatwave events, increasing drought periods and a rise in pest infestation and diseases due to favourable conditions e.g. for the bark beetle. The measure especially aims at tackling the long-term dangers of rising temperatures and changing precipitation distributions (including droughts), by the early identification and planting of site-adapted and climate-resilient tree species.

### **Sectors:**

The forest sector was the main focus of this measure, but adjacent sectors such as agriculture, tourism, nature conservation, spatial planning, and civil protection are indirectly influenced by improved reforestation practices and increased forest resilience, due to the diverse utility and protective functions that vital and intact forests provide, especially in the Puster Valley, where a large part of the forest is classified as protection forest. Without appropriate adaptation of forest management, these functions may not be sufficiently provided under changing climate conditions.

### **Adaption Measures:**

The training addressed adaptation measures such as selecting climate-resilient, site-adapted tree species in case of necessary, targeted reforestation, improved planting techniques, and management strategies that enhance the adaptability and resilience of forests to climate change. Raising awareness for the impacts of climate change on forests and the need to consistently consider climate change in all forest-related decisions already today, has provided an important perspective for internalizing these principles. By educating foresters, they can then act as multipliers for forest owners, who are ultimately often the most important actors for implementing respective adaptation measures.

### **How did you implemented the pilot action?**

After identifying adaptive capacity and adaptation needs through a workshop with local and provincial stakeholders in July 2023, we elaborated a rough design of the pilot action, discussed and refined it together with the stakeholders, and finally agreed on the detailed approach, content, roles

and involved actors in the detailed planning phase, which also included an on-site visit for planning the practical part together with one of the external experts (from October 2023 to September 2024).

The implementation of the measure took place on October 3 and 4, 2024, in the two forest inspectorates of the Puster Valley. Since the action was framed as an obligatory training for the approximately 50 foresters on the part of their heads, the workshop had to be divided into two days to maintain a dynamic and productive group size. The moderated theoretical part of the training took place in the morning and consisted of frontal expert-inputs followed by discussions. A concrete document with strategic guiding questions and a decision chain about reforestation was presented, discussed, and distributed, providing a basis for the following practical part.

Prior to the training, each forest inspectorate identified a representative forest site (e.g. regarding altitude, exposition, topography, etc.), where the practical part was conducted in the afternoon. There, the site conditions and their implications were discussed, before the groups were split. One group discussed the strategic questions mentioned above, e.g. *if* and *why* reforestation was needed based on the guiding questions, the other the question of *how* to plant and tried the presented methods and tools in a hands-on-part, before the groups switched.

In the aftermath, feedback to the training was asked via Mentimeter, as well as topics which should be consolidated, the practical applicability of the contents, necessary next steps and respective enabling framework conditions.

### **Have you achieved the desired goal with the implementation of the pilot action?**

The objectives of the workshop were to impart new knowledge in the field of artificial, targeted and climate-resilient reforestation, to raise awareness of the impacts of climate change on forests and to initiate the process of consistently integrating such aspects into forest management practices and respective decision processes. The target audience was thereby not only foresters themselves, but also representatives of the provincial administration, which are responsible for providing strategic frameworks and therefore the broad institutionalisation of these concepts.

The immediate aim of the training can be considered as achieved. Previously, the concept and the detailed techniques and approaches of artificial, climate-resilient reforestation were not very well known to the foresters and not part of their education, as the prevailing provincial strategy was almost purely aimed at natural rejuvenation. In addition, was the aspect of climate change itself maybe present, however not yet – at least in an institutionalized, traceable form – integrated in the decision-making processes of the foresters and at a higher level. This changed with the workshop, which gave a first input about these aspects and laid the ground for further actions.

We evaluated the achievement of the goals with an online feedback questionnaire for the participants immediately after the workshop and by conducting follow-up exchanges with the provincial forest departments and the participating forest inspectorates. Both revealed a high satisfaction with the training structure and the conveyed contents. In fact, 96% of the participants were satisfied or strongly satisfied with the workshop and were taught new perspectives of climate-resilient forest management, while 78% found the contents relevant or highly relevant for their everyday work. Random oral feedback confirmed these findings.

In addition, was autonomous action triggered in the local forest inspectorates and also at a provincial level. The training therefore kickstarted further consolidating activities on different levels, confirming the relevance of the aspects that were introduced with the trainings, whereby the inclusion of the responsible forest representatives of different levels was crucial in this regard. These carry-on-

activities are however somehow decoupled from the direct pilot action, as the responsibilities of the further proceeding were not clearly defined during the process. Rather were these actions conducted autonomously, which make it hard to follow the success of these actions from a project-point of view.



*Theoretical part of the training on the 3rd October 2024*



*Practical part of the training in a forest site and discussions about the site conditions*

**Please describe shortly your regional dissemination event:**

The dissemination events took place in the provincial EUSALP network meeting on November 27th and in an event series organized by the Civil protection agency of South Tyrol on April 28th. Hereby, the structure, the contents, the involved actors in planning and implementation, as well as the participatory process during the project and its context were presented both for the tourism and the forest tool to an audience that mirrored a broad range of mainly the provincial administration. The link between the Civil protection agency and the forest measure can hereby be described as especially valuable, given the already mentioned relevance of the protection forest for the society and civil protection activities. Looking at the vast calamity areas in the Puster Valley and beyond, important synergies arise between these two sectors.

A more comprehensive replication of the forest tool including the feedback and the need for follow-up activities was provided to the specific forest offices of the province, was however part of the service (D.2.3).

### **Which recommendations can you give to other regions?**

The immediate involvement and acquisition of the responsible local forest offices is crucial for the success of the measure, as they play a central role not only in the planning phase (by tailoring the action to the needs and providing input such as information about the forest site), but also in the implementation of the action, where they used their network to invite important actors beyond the foresters themselves and to identify thematic experts in the respective field, as well as in the follow-up phase, where they are responsible for the continuation and long-term anchoring of the activities.

Equally important is the commitment of the head of the provincial forest offices, not only to involve the respective thematic planning offices, but also to pursuing autonomous, continued action after the end of the project. The involvement of the provincial offices was right from the start seen as a requirement from their side, as they did not want to exclude parts of the province from the training but rather aimed at replicating it in all provincial inspectorates right from the beginning.

Here, however, a balance must be struck, as we observed some kind of distance and partly also slight reluctance between the local responsible foresters, who considered themselves as the practitioners with the knowledge of the specific needs, and the provincial administration, which was seen as partly decoupled from these “realities” and rather as brakeman of certain activities.

The size of the group had to be limited due to room- and personal capacities. As one indirectly main target of the measure were the forest owners, it would have been valuable to identify forest-owner representatives (if such structures do exist), farmers associations as representatives for the farmers, which often represent a large share of the forest owners, hunting associations, and large, private or publicly managed forest owners (e.g. church, forest self-administrations (=Eigenverwaltungen), federal forest owners etc.), as these actors do manage large parts of the forests themselves or represent important multipliers when it comes to training activities for their members and beyond.

The knowledge in the respective field was not available in the province itself. An interregional exchange, involving experts from Bavaria and Switzerland, was therefore crucial for the success of the measure. The identification of these experts was however challenging. Here, a permanent exchange with the local forest inspectorates is fundamental, not only to exploit their mentioned network, but also to ensure the consistency of the input with the local context and the practical relevance/applicability, which in purely academic contexts is sometimes missing. As these external experts were the backbone of the training, sufficient time and resources should be dedicated to this part.

As regards to the actors, we suggest a stronger, also active involvement of the forest nurseries, which play a central role in providing the right tree species in a sufficient quantity. Due to lead times of several years, this missing co-involvement can lead to bottlenecks in the implementation of measures. Together with the mentioned farmer’s associations or large forest owners, more attention should be given to the inclusion of these groups.

The feedback after the workshops provided interesting insights about the applicability of the contents, future needs and highlighted important points of contact for further – also autonomous – actions. More time should be dedicated to the elaboration of the feedback questions (also in

collaboration with the forest offices to extract important information going beyond the project structure) and for their response. Given that the second part of the workshop was conducted in a forest site, it was difficult to collect the feedback which was foreseen as an online survey. Here, alternatives, such as print-outs of the feedback questionnaire, should be taken into consideration.

The follow-up of the training and the replication of the results posed a challenge, as it was not clearly defined in the run up of the training, which materials were needed and in which format they were aimed to be integrated into. Although some potential intervention points were identified and the training materials were distributed among the participants, the concrete responsibilities for conducting these steps hindered a smooth and efficient follow-up of the training. These aspects should be addressed more carefully at the beginning of the planning phase of the training.

## Pilot Plan b

### **Describe the second pilot action you have implemented:**

The second pilot action of the ADAPTNOW project is a roadmap for enhancing climate change adaptation in the tourism sector of the Puster Valley. This action involved a seminar, and a workshop aimed at bridging knowledge gaps between local tourism stakeholders and climate adaptation experts. The focus was on identifying the specific, most pressing climate risks that the regions face, exploring best practices in adaptation measures, and adapting and integrating these into the local context.

The action included a theoretical block in the form of an online informational event, addressing climate scenarios for the Puster Valley, identifying climate-related risks for the tourism sector, and presenting general adaptation options in the tourism sector, presented by experts on the topic of climate-adapted tourism. This first introductory module aimed at building a common knowledge base about the climatic impacts, adaptation necessity and the general adaptation concepts and approaches available.

The second, in-depth module was designed as an interactive workshop. External experts provided insights into concrete adaptation options for the two key risks in summer and winter tourism as a starting point for the following group work, where the touristic and non-touristic stakeholders the stakeholders were guided by professional moderators to discuss the presented adaptation measures and to adapt and align these to the touristic contexts of the Puster Valley. Thereby, a systemic view was approached, which also included the identification of affected touristic sub-systems, the identification of the socio-economic and touristic status quo regarding climate risks and adaptation, the elaboration of shared visions among all the participants and the concrete milestones and activities, whereby the latter were at the centre of the discussions.

External experts then processed this local knowledge, enhanced it and communicated it ultimately in the form of a roadmap, with the intention to transfer or integrate them into existing thematic tools and initiatives. This roadmap focuses on providing adaptation pathways and outlines necessary steps to reach the vision of a resilient tourism in the Puster Valley, highlighting the responsible actors and prioritizing high-relevance measures. However, as this product should not only guide the adaptation process specifically in the Puster Valley but should rather also be replicated and integrated in other contexts, the whole projects process, the participatory elements, the design of the workshops and the strategies for replicating the outcomes were described. The roadmap was provided in German, Italian and English to achieve the widest possible reach.



### **Sectors:**

The primary sector affected is tourism, including winter and summer outdoor recreational activities and infrastructure, hospitality services, and destination management. However, in the course of the participatory workshop, subsystems in the touristic and non-touristic field were identified, which are not only affected by climate risks and adaptation activities in the touristic field, but are also key success factors when it comes to the planning and implementation of concrete adaptation factors. These sectors include environmental and nature conservation groups, agriculture, infrastructure providers and the general public society.

### **Hazards:**

Within the pilot action, we identified region-specific climatic hazards by downscaling climate models to the regional provincial level. The prevailing hazards include altered precipitation patterns with more frequent heavy rain events and related extreme weather events with respective gravitational hazards, leading to safety issues for tourists, as well as impacts on natural attractions and the touristic infrastructure. General temperature increase with more frequent heatwave events and tropical nights and increasing drought periods affect the whole touristic season. A decrease in frost days, snow cover and precipitation in the form of snow, especially at lower altitudes, pose a significant threat to the regionally important winter tourism sector.

### **Adaption Measures:**

Adaptation measures will encompass developing resilient tourism destinations, promoting safe practices among tourists and operators, and enhancing emergency preparedness and response to climate-related events. Specific adaptation measures range from specific climate risk assessments and managing infrastructure, the promotion of scientific studies and market research, the elaboration of mission statements, communication and awareness raising-activities to the concrete process of adapting the touristic structures.

### **How did you implement the pilot action?**

The planning process started with a workshop in July 2023 to identify the current adaptive capacity, as well as gaps and needs in climate change adaptation. A first draft of the workshop contents and

the respective structure was discussed in a number of coordination meetings with identified touristic stakeholders at the beginning of 2024, where inter alia two key risks for the tourism sector – one for winter and one for summer tourism - were selected out of a range of key risks which were identified for the province in another research project. These key risks posed the starting point for the following detailed planning phase, where the workshop topics and the identification of external thematic experts were aligned towards them.

Finally, the two half-day modules were held in October 2024. The first part was conducted online and aimed especially at providing inputs about climate change, climate risk and general adaptation options and therefore to align the knowledge base among the participants. The second workshop built on these basics, deepened the discussions about potential adaptation options through two inputs from external experts and had a group work for the elaboration of detailed, tailored adaptation measures for tackling the two key climate risks at its core.

This was done through so-called Canvas – empty templates for each the summer and winter tourism – which guided the discussions in a structured way: from commonly identifying affected subsystems, elaborating a shared vision among the participants, identifying milestones and detailed adaptation measures to achieve this vision, including the actors to be involved and potential challenges and opportunities.

The groups were changed once so that each stakeholder participated in each group for summer and winter tourism. A detailed protocol of these workshops was shared among the participants for feedback, was complemented by a team of experts and translated into a roadmap, which was the final output of this pilot action. It contained information about the ADAPTNOW project, the stakeholder process, climatic developments in the region and the results of the in-depth workshop in the form of a graphical roadmap with respective detailed descriptions.

The roadmap was presented and rolled out to touristic stakeholders and beyond in April 2025, with the strategic intention of integrating it in existing online platforms and to support the Provincial Association for Destinations Management.

### **Have you achieved the desired goal with the implementation of the pilot action?**

The primary aim of the pilot action was to raise awareness of climate change adaptation among tourism stakeholders and to develop measures for climate change adaptation as well as the process for their implementation, which were to be presented in the form of a roadmap. This was to take place with the close involvement of tourism stakeholders to be able to address the special features and diversity of the tourism sector in the Puster Valley, consider the current status quo as a starting condition. At the same time, the roadmap should primarily describe the adaptation planning process so that it can be replicated in other contexts.

The extensive involvement of tourism stakeholders in the planning and organization of the workshops ensured that the most important and practically relevant key risks in the tourism sector were addressed. While the introductory workshop primarily served to raise general awareness of climate change and its effects, the in-depth module specifically addressed the identified key risks, analyzed the socio-economic and tourism related status quo and developed specific adaptation measures relevant to the Puster Valley.

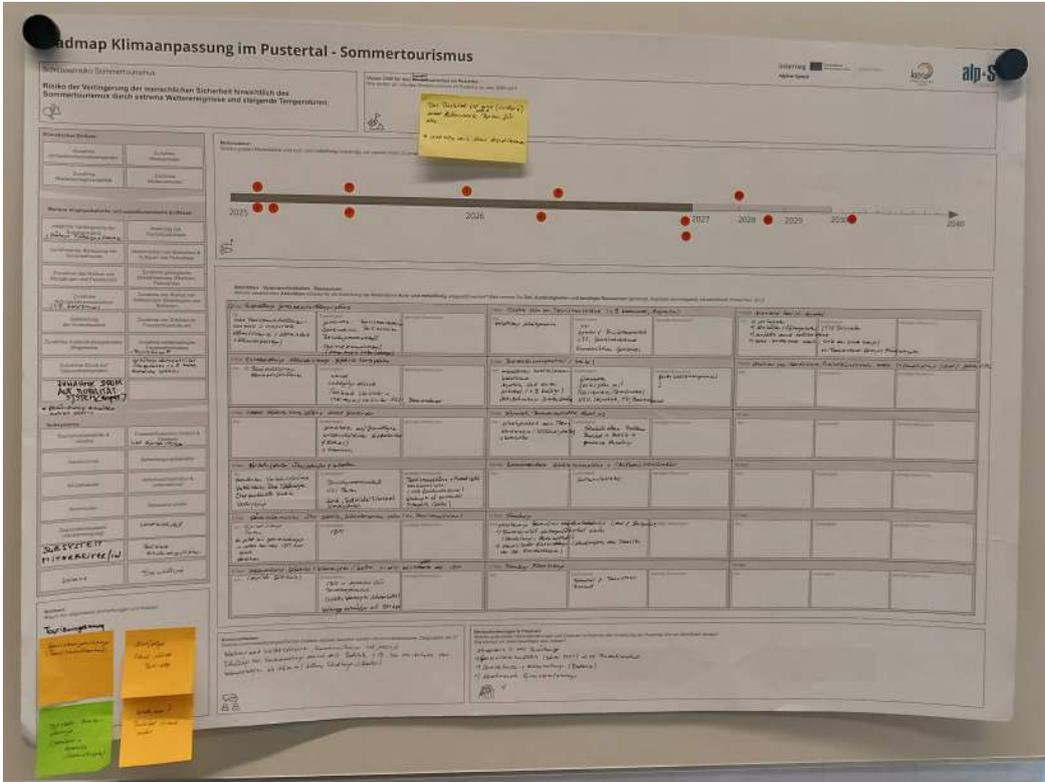
An online feedback questionnaire, conducted after the workshop, showed that 90% of workshop participants were satisfied to very satisfied with the content and structure of the workshop. At the same time, the feedback showed that for almost 40% of the participants, the measures presented

and developed together with external experts were not really or only partially new. Therefore, some of the content seemed to have been already known or awareness of climate adaptation measures was already present.

55% of the participants stated that the measures were highly or very highly practicable. The objectives were therefore also partially achieved in tourism-pilot action, although some measures were still considered as too abstract. In this case, however, the workshops and the roadmap can serve as a starting point for in-depth analyses, cooperation and initiated planning of more specific measures in the respective target areas. The roadmap represents more a kind of guideline as to which dimensions should be taken into account when starting the adaptation process and cannot be simply used as a universally valid and detailed 'recipe'. Rather, it is a starting point for adaptation and has now to be consolidated in the Puster Valley.



Input about the key climate risks in the tourism sector at the participatory stakeholder workshop



The roadmap-canvas, which served as a guiding template for the group works about adaptation in the tourism sector

**Please describe shortly your regional dissemination event:**

The dissemination events took and will take place in the provincial Eusalp network meeting on November 27 and in an event series organized by the Civil protection agency of South Tyrol on April 28. Hereby, the structure, the contents, the involved actors in planning and implementation, as well as the participatory process during the project and its context were presented both for the tourism and the forest tool to an audience that mirrored a broad range of mainly the provincial administration.

On the 1<sup>st</sup> of April 2025, a specific dissemination event about the developed measures in the tourism pilot action will be conducted. Here, we will present the elaborated output, a roadmap for adapting the tourism sector in the Puster Valley to climate change to a wider audience. The main target group of this event will not only be the touristic stakeholders which participated in the workshop, but also other actors – within and beyond the touristic sector - which we consider relevant for implementing and carrying forward the contents of this roadmap. The detailed presentation of the roadmap - which was developed based on the results from the in-depth workshop with local stakeholders – is followed by feedback and a structural discussion.

**Which recommendations can you give to other regions?**

One of the key elements for understanding the needs for actions, the responsibilities for their implementation and for tailoring adaptation actions is to understand the touristic structure and the distribution of responsibilities at various levels (tourism associations, institutionalization of destinations, provincial departments and competencies). Only then can adaptation activities be effectively integrated, implemented and anchored in the respective structures. This part should therefore play a fundamental role and should be dedicated respective resources to, especially at the beginning but also throughout the whole adaptation process.

The main aim of the participatory workshop was to identify adaptation pathways for the tourism sector. While social and environmental aspects cannot be excluded in these discussions, the group work was partly captured by environmental groups, which organized themselves in the run-up to the workshops. The fine line between identifying necessary and appropriate adaptation options in the tourism sector and discussing broader issues about the regional carrying capacity and tourism development in general, must be considered and requires a good balance in the selection of participating stakeholders and the design of the whole process (incl. feedback loops etc.).

Given the fragmented governance and the high (and short-term) economic interests in place, the implementation phase should be accompanied by professional actors to address and manage diverging interests and conflicts. Therefore, such a participatory process can and should only pose a starting point for concrete adaptation planning, which has to be continuously guided and monitored.

## Region 3 | Municipality of Chivasso, Piedmont Region (IT)



Pictures related to the Municipality of Chivasso. Source of the picture: <https://www.comune.chivasso.to.it/>.

Pilot Coordinator: iiSBE Italia R&D

Pilot Support:

- Metropolitan City of Turin (Department of territory, spatial planning, building planning and civil protection)
- Piedmont Region - Directorate strategic environmental assessment
- Piedmont Region - Health department
- Piedmont Region – Urban Planning department
- ASL (Local Health Authority) of the City of Turin
- Regional Epidemiological Centres - Piedmont Region
- Observatory of the epidemiological network in Piedmont Region
- “Parco del Po” authority - Polytechnic of Turin
- City of Turin - Environment department (City Climate Adaptation plan)
- Chamber of Architects in Turin (OAT)
- ARPA - Regional Agency for Environmental Protection
- UNCEM (National Union of Mountain Communities)

### Pilot Plan a

**Describe the first pilot action you have implemented:**

**Support to the development of a “climate resilient” General Urban Plan, including adaptation measures to climate change.**

The municipal administration of Chivasso is currently engaged in the revision of the city General Urban Plan dated 2004 and, in the meantime, it is also elaborating the SEA - Strategic Environmental Assessment (VAS – *Valutazione Ambientale Strategica*, as per Italian). The municipality wants to introduce, in those strategic documents, the risk assessment due to climate change and of course, the adaptation strategies and measures related to the risks identified. Furthermore, Chivasso has no Climate Change Adaptation Plan and is about to renew the Covenant of Mayors.

The contemporaneity of all these circumstances has ensured the optimal basic condition for PP6 iiSBE Italia R&D, to develop a climate service strictly focused on Chivasso municipality needs, implementing a decision-making process to identify the optimal measures to increase the level of adaptation and resiliency of the municipality, to be included both in the General Urban Plan and within the SEA.



*Picture taken during the mutual exchange with the Municipality of Chivasso and the Paglia Associated Firm.*

More precisely, the pilot action A started with the organisation of a moment of mutual exchange with the Municipality of Chivasso and the Paglia Associated Firm, which is the architectural firm in charge of the review of the Chivasso General Master Plan. The objective of the meeting was to identify the climate risks affecting the municipal area; the ones considered the most relevant for the territory were the extreme temperatures, heavy rain and drought. Special attention was given to the risk related to the extreme temperatures, because the heat island effect has become increasingly common in Chivasso.

Based on that, PP6 iiSBE Italia R&D has developed, thanks to several exchanges with climate risk experts, an innovative methodology able to identify the urban areas with the greatest climate vulnerability level to extreme temperatures with regards to the citizens health.

The strong basis on which the risk formula has been developed are the contents included in the 6<sup>th</sup> assessment report of the Intergovernmental Panel on Climate Change (IPCC AR6) and the “Climate Risk Sourcebook<sup>1</sup>” developed by GIZ together with EURAC Research.

Actually, the methodology produces a climate risk map that highlights the urban areas with the greatest vulnerability, with respect to which it is possible to plan adaptation strategies to prevent/limit the risks related to climate change. Quantitative indicators, selected on the basis of the climate risk considered, make it possible to tangibly select the proper adaptation measures for the specific area assessed, providing the municipality with actual numbers related to the benefits the adaptation measures can generate in the micro-urban area.

Based on that, the Municipality can identify the best solutions scenario to be implemented to make the municipality more resilient to extreme temperatures risk. Furthermore, quantitative indicators can be used also to monitor the effectiveness of the climate resilience performance of the municipality over time, changing the adaptation strategies if necessary.

The methodology is applicable to any urban context, therefore replicable in any other municipal context and the results it generates are objective.

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<sup>1</sup> [https://www.adaptationcommunity.net/wp-content/uploads/2023/10/giz\\_2023\\_Climate\\_Risk\\_Sourcebook.pdf](https://www.adaptationcommunity.net/wp-content/uploads/2023/10/giz_2023_Climate_Risk_Sourcebook.pdf)

### **Hazards:**

As mentioned previously, the hazards affecting the Municipality of Chivasso are extreme temperatures, heavy rain/flood and drought. Heatwaves represent a very dangerous climate hazard for the municipality of Chivasso. The areas with high heatwaves risk have been identified. During the last twenty years a high degree of drought has been highlighted. This phenomenon has generated the lowering of the aquifers and the agricultural sector has much suffered the consequences of the droughty climate. Heavy rains and floods represent a climate hazard affecting the municipality of Chivasso, indeed, Chivasso is located at the confluence of three rivers and 1994 and in 2000, it has suffered two very important floods. Another major problem are the heavy rains the city is experiencing frequently during the last decade.

### **Sectors:**

Based on the development of an innovative methodology able to identify the urban areas with the greatest climate vulnerability level to extreme temperatures with regards to the citizens health, the health sector has been highly considered. Piedmont Region, together with the Local Health Authority of the City of Turin, the Regional Agency for Environmental Protection, the Regional Epidemiological Centres and PP6 iisBE Italia R&D, are elaborating a “Urban Health Protocol” (a multi-criteria assessment tool useful to evaluate and measure how much the built environment at urban scale impacts on the health of inhabitants and how much it preserves them from climatic hazards). Chivasso will be the first pilot case of Piedmont Region to test the Urban Health Protocol.

Concerning the urban infrastructures, the ones taken into consideration for the Municipality of Chivasso are the railway, the main roads on the territory and the motorway that crosses near the municipality. The whole building sector has been considered.

### **Adaption Measures:**

The Pilot Action A foresees the identification of the proper adaptation measures for the micro-urban areas of the Municipality of Chivasso identified as more vulnerable to extreme temperatures risk. To find the most appropriate ones, quantitative indicators, focused on the main parameters that most influence the heat island effects, have been elaborated, to suggest the adaptation solutions which can better improve the resilience of the small areas.

In particular, the selected criteria, tested on a small urban area in Chivasso, are listed below, together with a brief description of the intent and the unit of measure:

<b>T.E.1 Capacity of paved surfaces to reflect solar radiation</b>	
<b>Description</b>	This criterion uses the average value of the Solar Reflectance Index (SRI) calculated for all paved horizontal surfaces in an urban area to estimate the overall effectiveness in reducing heat accumulation. The main objective is to evaluate the ability of the urban area to reflect solar radiation and dissipate the accumulated heat, mitigating the urban heat island effect. The higher the average value of the SRI, the more efficient the urban area will be in managing solar energy, improving the livability of urban spaces and helping to reduce the environmental impacts associated with heat storage.
<b>Indicator</b>	Solar Reflectance Index (SRI)
<b>Unit of meas.</b>	Medium SRI
<b>T.E.2 Capacity of the roofs to reflect solar radiation</b>	
<b>Description</b>	This criterion uses the average value of the Solar Reflectance Index (SRI) calculated for all roofs in an urban area to estimate the overall effectiveness in reducing heat accumulation. The main objective is to evaluate the ability of the urban area to reflect solar radiation and dissipate the accumulated heat, mitigating the urban heat island effect. The higher the average value of the SRI, the more efficient the urban area will be in managing solar energy, improving the livability of urban spaces and helping to reduce the environmental impacts associated with heat storage.
<b>Indicator</b>	Solar Reflectance Index (SRI)
<b>Unit of meas.</b>	Medium SRI
<b>T.E.3 Urban solar reflectance</b>	
<b>Description</b>	The reflectance of the urban area is measured through albedo. Albedo refers to the fraction of sunlight that is diffusely reflected by a body and is defined by the ratio of radiance to radiation received by a surface. The albedo is measured on a scale ranging from 0 (corresponding to a black body that absorbs all incident radiation) to 1 (corresponding to a body reflecting all incident radiation). The reflected proportion is not only determined by the properties of the surface itself, but also by the spectral and angular distribution of solar radiation reaching the Earth's surface. These factors vary with atmospheric composition, geographical location, and weather; for this reason, if we consider the differences of the different materials, we can see that the more reflective a surface is, the higher the albedo value. The goal is to maximize the reflection of solar radiation to prevent urban heat island generation.
<b>Indicator</b>	Medium Albedo
<b>Unit of meas.</b>	-
<b>T.E.4 Availability of green areas</b>	

<b>Description</b>	The criterion assesses the ability of an urban area to mitigate the heat island effect through the presence and distribution of green areas, considering the percentage of green areas compared to the total urban area. Green areas include parks, public gardens, urban woodlands, green roofs and other vegetated surfaces. This indicator is crucial for promoting natural cooling and improving the urban microclimate, reducing local temperatures and improving thermal comfort.
<b>Indicator</b>	Percentage of green areas over the total urban area
<b>Unit of meas.</b>	%
<b>T.E.5 Shaded paved surfaces</b>	
<b>Description</b>	This criterion assesses the amount of urban surface covered by shade at a specific time, i.e. at 12:00 noon on 21 June (the day of the summer solstice), and is useful for understanding the effectiveness of urban strategies in mitigating heat islands and promoting the thermal comfort of public spaces. Calculated as the ratio between the total area of shaded surfaces and the total area of the urban area under consideration, it provides a percentage value that highlights how widespread the shade is in the central hours of the summer day. Through the analysis of shadow projections of buildings, vegetation and other shading structures, the indicator makes it possible to assess the effectiveness of urban planning in generating natural or artificial shade and reducing excessive heating of surfaces.
<b>Indicator</b>	Percentage of the paved shade areas at 12.00 noon on 21 <sup>st</sup> June over the total paved surfaces
<b>Unit of meas.</b>	%
<b>T.E.6 Sky View Factor</b>	
<b>Description</b>	The Sky View Factor (SVF) is a fundamental metric in urban and environmental studies, as it measures the portion of the sky visible from a specific point, influencing temperature conditions and radiation levels in urban spaces. SVF is essential to describe urban climatology at scales below about 100 m, this proxy for net radiation depends on the height of obstacles in its surroundings. The goal is, therefore, to maximize the dispersion of the heat accumulated by paved surfaces during the day through radiative cooling at night.
<b>Indicator</b>	Medium SVF
<b>Unit of meas.</b>	-

Based on the vulnerability results achieved for each indicator calculated, it has been possible to evaluate the overall vulnerability of the selected small-urban area in Chivasso by normalising the values and giving to each indicator a specific weight reflecting the importance of it among all.

The relative vulnerability values, achieved for each indicator, have allowed to highlight some critical issues in the area (like for example the high percentage of surfaces paved with dark asphalt, or the lack of green areas). Based on those quantitative values, specific adaptation measures have been elaborated, providing the Municipality of Chivasso with a precise recommendation on where to act and how, predicting the resilience contribution the measures will guarantee to the area. Indicators will allow the city also to monitor those parameters over time.

### **How did you implement the pilot action?**

The valuable cooperation among PP6 iisBE Italia, the representatives of the urban sector of the municipal administration of Chivasso and the architectural firm (Studio Paglia) in charge of the review of the General Urban Plan has guaranteed the effectiveness of the Pilot Action A implementation, because it has been essential to better understand the peculiarities of the territory and to acquire data to perform calculations.

Steps followed to implement the pilot action and to elaborate the outputs are summarised below:

1. **Urban scale risk assessment of extreme temperature in relation to health.** To calculate the extreme temperature risk in the Municipality of Chivasso, a GIS tool has been used to process satellite images containing information on the temperature and state of the vegetation, in particular, the satellite images of Landsat-8<sup>2</sup>.



Screenshot of the Landsat map downloaded from the USGS portal <https://www.usgs.gov/>.

<sup>2</sup> <https://earthexplorer.usgs.gov/>

The project has been implemented in the open-source software Qgis together with the shapefile of Chivasso footprint. Subsequently, the following risk formula, which has been elaborated by PP6 iISBE Italia, was applied to the Chivasso territory:

$$HV^{W_{HV}} \times EV^{W_{EV}} \times VV^{W_V}$$

Where:

**HV** is the value of the HAZARD

**EV** is the value of the EXPOSURE

**VV** is the value of the VULNERABILITY

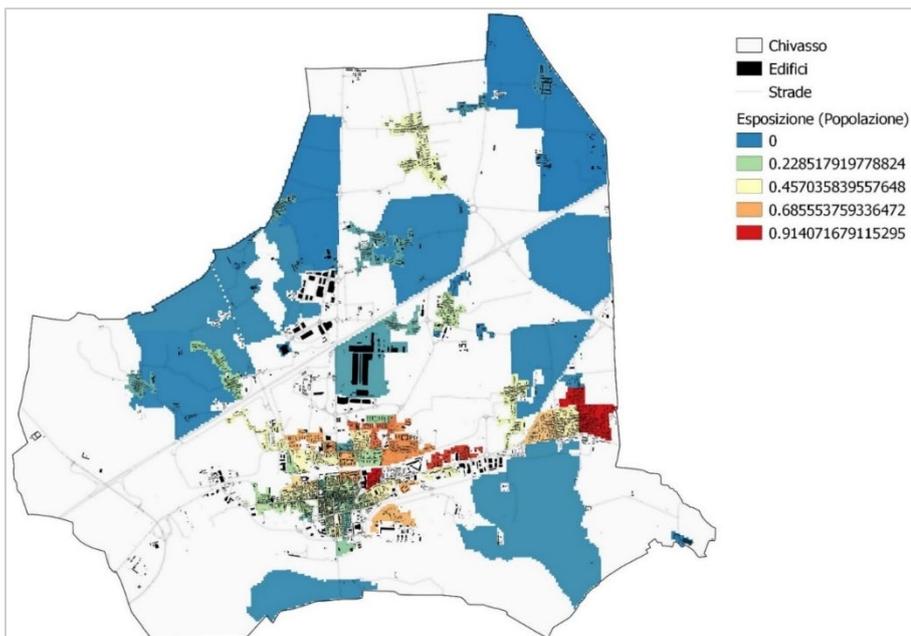
**W<sup>HV</sup>** is the weight associated with HV

**W<sup>EV</sup>** is the weight associated with EV

**W<sup>V</sup>** is the weight associated with VV

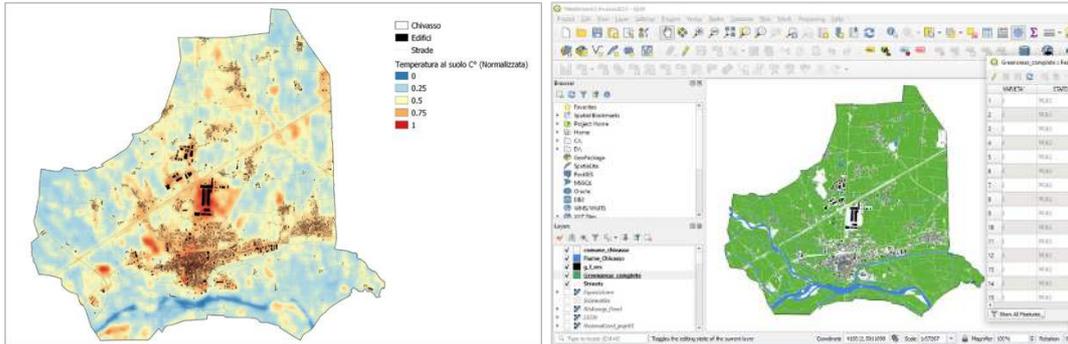
Hazard assessment. For the hazard assessment, a value of 0 to 1 must be assigned to the city of Chivasso depending on the probability of the event occurring in the area (0 is a low probability of the hazard occurring and 1 is a high probability). To determine this value, it is essential to check the contents of the SECAP (if the municipality has it) otherwise, by checking historical data and the different environmental platforms that assess the risk of territories. The Hazard value assigned to Chivasso is 0,8 and the weight associated with is 0,25.

Exposure assessment. In the case of the Municipality of Chivasso, the exposed elements are the inhabitants of the area, particularly the vulnerable ones (under 10 years old and over 65). Data related to the vulnerable population have been implemented in Qgis and processed with the census zones, originating the following exposure map. The weight associated with exposure is 0,25.



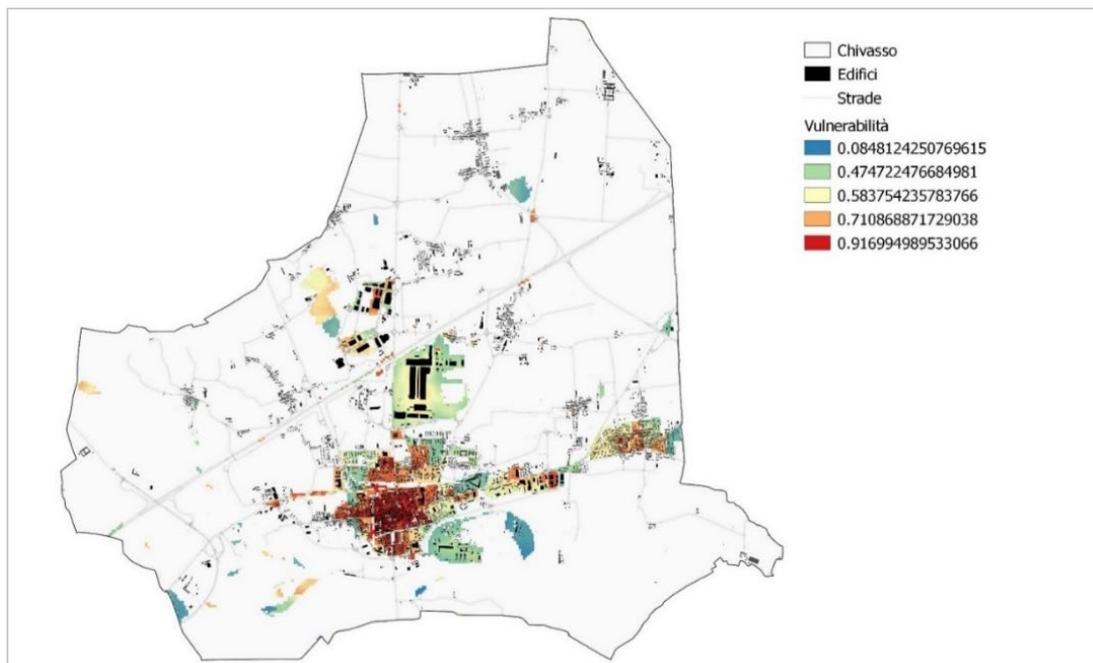
*Exposure map related to the vulnerable inhabitants distribution.*

**Vulnerability assessment.** It considers simultaneously the Land Surface Temperature (LST) and the green area. Following specific procedures, both maps have been elaborated.



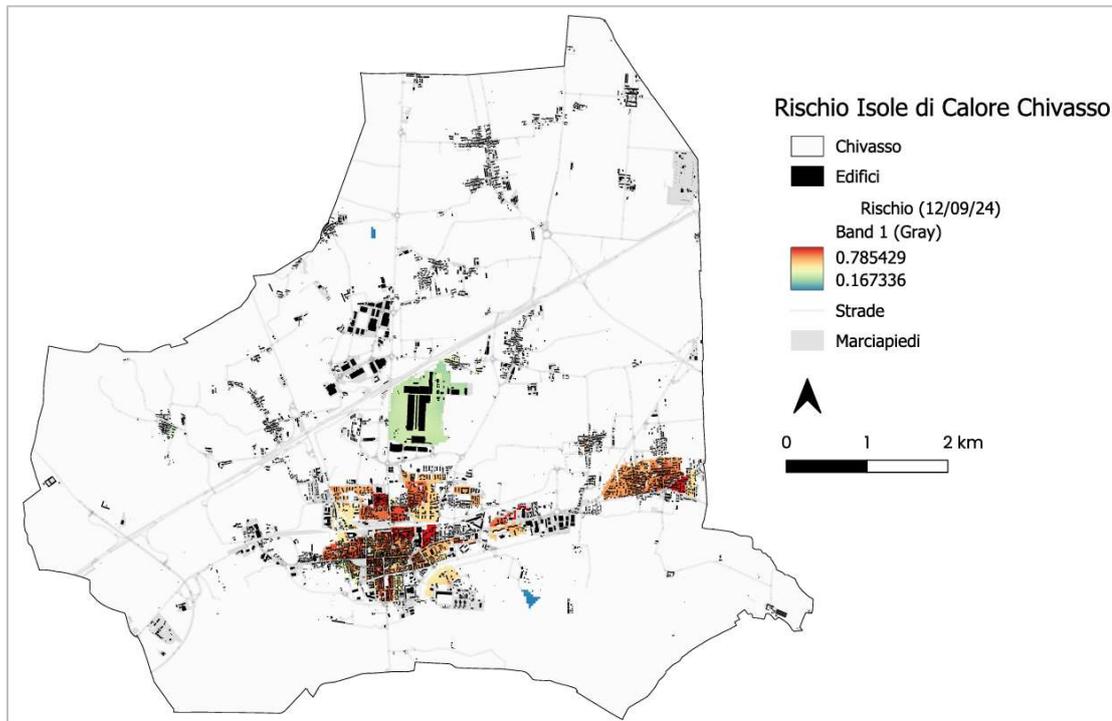
*LST Map and permeability Map of the Municipality of Chivasso.*

The interpolation among the results of the above two maps has generated the map related to the impermeability of the soil in Chivasso, a key aspect to be taken into consideration when addressing the heat island effect. The resulting vulnerability map, based on LST, green area and permeability of soil has been elaborated for the Municipality of Chivasso, highlighting with red color the area with high vulnerability. The weight associated with vulnerability is 0,50.



*Vulnerability map of the Municipality of Chivasso.*

**Risk assessment.** To proceed with the risk calculation, all levels must be normalized to values from 0 to 1 through the "raster" normalization tool on Qgis and all layers must be in raster format. Once the values have been normalized, the risk map related to extreme temperatures with reference to health for the inhabitants of Chivasso has been elaborated.



*Risk map of the Municipality of Chivasso.*

The risk map above highlights in red the area with the highest risk for the population of extreme temperatures.

- Small urban scale zoning and risk assessment.** Starting from the risk map developed for the overall Municipality of Chivasso, small urban areas, characterized by high risk, have been identified through census zones and urban morphology criteria. 20 small urban areas have been identified and the risk level calculated for each of them, as shown in the image below.



*Identification of the small urban areas within the Municipality of Chivasso and the mean risk value of each.*

3. **Extreme temperature assessment at small urban scale through indicators calculation.** Risk assessment at small scale has been performed thanks to the use of specific criteria strictly interrelated with the parameters that most influence the heat island effects (listed in the previous paragraph).

Among the 20 small urban areas identified in Chivasso, the one with the highest vulnerability value (Area G) has been selected to be tested, applying the chosen indicators to better understand which factors are the most impactful in relation to extreme temperatures vulnerability. The area G has been redesigned on AutoCAD and its surfaces fully characterised with the proper materials. Indicators have then been applied and in some cases the Qgis software has been used to perform the calculation. Based on the vulnerability value achieved for each indicator calculated, it has been possible to evaluate the overall vulnerability of the selected small-urban area G in Chivasso. On the other hand, the relative indicator vulnerability values have allowed to highlight some key issues making that area vulnerable to extreme temperatures risk.



*Characterisation of the surfaces in the small urban area G of Chivasso.*

4. **Development of climate adaptation measures.** Quantitative results, achieved through the application of the indicators, have allowed to elaborate specific adaptation measures for Area G of the Municipality of Chivasso. Indeed, since the values are related to measurable aspects, precise suggestions on where and how to act have been recommended to the municipality. Some scenarios have been developed assuming the exact quantity of black asphalt to be removed and replaced with material with a higher SRI value, to be able to improve the score of that indicator and, consequently, the overall vulnerability of the area. Other considerations have been pointed out in relation to the greening, calculating the square meters of green area to be introduced in Area G to enhance its resilience. Furthermore, indicators will allow the city to monitor those parameters over time.
5. **Introduction of adaptation measures in urban planning tools.** The introduction of such kind of adaptation strategies and approaches within urban planning instruments is not a simple process because several aspects must be considered. iiSBE Italia, together with the decision-makers and the technician of the Municipality of Chivasso and the architectural firm responsible for the review of the General Urban Plan of the city are working to find the proper solutions for the integration of the adaptation measures within the “Environmental Report” and in the “Urban Plan Technical Provisions”. Furthermore, specific climate risk standards for new urban development areas will be included in the technical provisions, together with a counting frame of NBS, incorporated as annex.

## Have you achieved the desired goal with the implementation of the pilot action?

The Municipality of Chivasso is the first municipality to have adopted this strategic vision, with the aim of introducing climate change adaptation measures in the Master Regulatory Plan by adapting the territory and preserving the health of its citizens. This approach has already received a prestigious reward on December 14<sup>th</sup>, when the Municipality of Chivasso proudly received the first national prize "Virtuous Municipalities 2024", in the "Land Management" category, rewarding its unconventional experience in the application, within the ongoing revision of the Municipal Regulatory Master Plan, of an innovative methodology capable of identifying the urban areas with the greatest climate vulnerability level.



*Pictures taken during the award ceremony for the first national prize "Virtuous Municipalities 2024" won by Chivasso.*

Furthermore, the Municipality of Chivasso has participated in a Regional Programme (Piedmont Region) on the ecological transition and resilience, strictly focused on Urban Forestry, nominating a greening project for whom it has been quantified the benefit generated by the introduction of climate change adaptation measures using the methodology and the adaptation indicators developed by iISBE Italia in the context of the ADAPTNOW project.

Indeed, numerical results obtained from the calculation of the indicators show how much the adaptation measures, hypothesized for the area taken as an example, improve the fundamental parameters that influence the risk of extreme temperatures for the health of living beings and more generally the resilience of the area.



This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space Programme

*Maps of a small urban area of Chivasso presented for the participation in the Regional Programme on Urban Forestry.*

Last but not least, based on the Pilot Action A developed by PP6 iiSBE Italia, others Italian municipalities have shown great interest in applying the methodology developed and others collaborations started, on such topics, within the framework of an Interreg Central Europe project, named SuPerBE (<https://www.interreg-central.eu/projects/superbe/>) in which iiSBE Italia is partner.

**Please describe shortly your regional dissemination event:**

The dissemination event took place on February 5<sup>th</sup>, 2025, at the Council Chamber of the Municipality of Chivasso, in the province of Turin (IT), organized by PP6 iiSBE Italia R&D.



*Pictures taken during the Dissemination Event organised by iiSBE in Chivasso.*

During the event, Andrea Moro, president of iiSBE Italia, has illustrated to the stakeholders involved, the methodological approach developed by iiSBE Italia R&D, in the context of the European Project ADAPTNOW for the elaboration of the climate risk map of Chivasso, which is able to identify the urban areas at greatest climate risk, with respect to which it is possible to plan adaptation strategies to prevent/limit the risks related to climate change.

The dissemination event was attended by many regional bodies, including the Piedmont Region Environment, Energy and Territory Directorate, ARPA, the Metropolitan City of Turin, the Archaeological Superintendence and others. Neighboring municipalities have also been invited, in order to disseminate the good practice in the area.

**Which recommendations can you give to other regions?**

To easily implement Pilot Action A in other countries/regions, it is fundamental to have an effective data organization within the municipality, even better if data are available on GIS format, in order to be able to produce accurate risk maps. Furthermore, cooperation among different actors of the different urban sectors within the municipality, holders of data information, is crucial, in order to get all the input necessary to perform the calculation.

Looking forward that the pioneering experience of the Municipality of Chivasso as forerunner in the introduction of adaptation measures in the Master Regulatory Plan can be an example to follow for all municipalities.

## Pilot Plan b

### **Describe the second pilot action you have implemented:**

#### **Strengthening the skills of municipal planners and decision makers regarding the procedures for integrating adaptation measures into strategic planning.**

The second pilot service developed for the Municipality of Chivasso is a capacity building service and can be replicated in any other regional contexts. It has as main objective to strengthen the skills of the *decision-makers*, working within the municipal context in planning activities and of the *professionals*, working as a freelancer in the field of the urban planning, in relation to the climate change risk assessment and to the procedures for the integration of the adaptation measures within the strategic planning process (Pilot Action A).

The climate and resilient urban planning is not a well-known and articulated procedure in Italy, furthermore, knowledge and competencies in this field are not so widespread thus, the capacity building service to be developed consists in the transfer of the decision-making methodology to identify the optimal measures to increase the level of adaptation and resiliency of the municipality.

The transfer also addresses the way to include those adaptation measures both in the Master Plan and within the SEA. The involvement of key stakeholders in the field of the planning activities is crucial; the transfer of knowledge and competences takes place through the involvement of stakeholders in the implementation of the climate risk analysis activities and in the development of the adaptation measures. Workshops, round tables and training activities are the main engagement opportunities.



*Picture taken during the workshop organised with regional stakeholders focused on climate risk analysis activities.*

#### **Sectors:**

The same of Pilot Action A.

#### **Hazards:**

The same of Pilot Action A.

#### **Adaption Measures:**

The adaptation measures developed in Pilot Action A have been deeply illustrated to the stakeholders involved in workshops, events and meetings organised during the overall development of such Pilot Action.

### **How did you implement the pilot action?**

The pilot action in Chivasso has been implemented thanks to a strong partnership among PP6 iiSBE Italia, the representatives of the urban sector of the municipal administration of Chivasso and the architectural firm (Studio Paglia) in charge of the review of the General Urban Plan and of the elaboration of the Strategic Environmental Assessment.



*Picture taken during the meeting organised with Chivasso technicians and decision-makers.*

The Pilot Action B has been implemented in parallel during the overall development of Pilot Action A, through the local and regional organization of interactive workshop, training events, involvement in project meetings and in the activities related to the follow-up of the ADAPTNOW project.

### **Have you achieved the desired goal with the implementation of the pilot action?**

Stakeholders to whom the Pilot Action B was addressed to, have acquired knowledge on climate change risk assessment, capacity building in implementing adaptation measures in urban planning activities and skills in elaborating exposure, vulnerability and risk maps. They all expressed gratitude to the opportunity they had in learning more about climate adaptation and risk mitigation through the Pilot Action B implementation in their context.

### **Please describe shortly your regional dissemination event:**

The dissemination event took place on February 5<sup>th</sup>, 2025, at the Council Chamber of the Municipality of Chivasso, in the province of Turin (IT), organized by PP6 iiSBE Italia R&D.

This was the occasion to illustrate to several stakeholders, with different backgrounds, the methodology elaborated in Pilot Action A, training them of the topics concerning climate risk assessment and adaptation.



*Pictures taken during the Dissemination Event organised by iiSBE in Chivasso.*

The dissemination event was attended by 18 stakeholders in person and 27 through online connection, among them participated many regional bodies, including the Piedmont Region Environment, Energy and Territory Directorate, Regional Agency for Environmental Protection (ARPA), the Metropolitan City of Turin, the Archaeological Superintendence and others. Neighboring municipalities have also been invited, in order to disseminate the good practice in the area.

**Which recommendations can you give to other regions?**

Since the climate and resilient urban planning is becoming more and more fundamental to properly adapt cities to the climate change effects, knowledge and competencies in this field are crucial to properly act at local level. Improving the skills of the decision-makers and of the professionals/technicians in this field is an investment to the prosperous and resilient future of the cities and both, politicians and technicians working within the municipalities must be aware of that.

## Region 4 | City of Kempten



Pilot Coordinator: Energy and Environmental Centre Allgaeu (eza!)

Pilot Support: Energy and Environmental Centre Allgaeu (eza!)

### Pilot Plan a

#### **Describe the first pilot action you have implemented:**

##### **Sun detectives and heat awareness raising campaign**

To increase children's awareness of heat waves and how to cope with them especially in overheated school buildings, the "sun detectives" program was conducted at two primary schools in Kempten. Both schools are already carrying out climate protection activities as "Klimaschule" (a programme for transforming to a climate neutral school operation). Several temperature measurements were conducted by the pupils over a four-month period (March to June) and data was then evaluated to get an impression of the heat vulnerability of the school building and the classrooms respectively. Based on the results actions for climate adaptation were recommended (shading, ventilation,...). The measurements were part of a larger context regarding heat awareness and protection. Other aspects were: ventilation of the classrooms, UV-radiation, sun protection and healthy nutrition during heat waves. The pupils presented their results at an info point on climate adaptation at the weekly market in Kempten in cooperation with the urban planning department and the local group of Health for Future. Furthermore, the city of Kempten installed three drinking fountains in the city centre in summer 2024. Another component of the awareness campaign was a natural hazard model which was available for experiments during a climate adaptation workshop with high school students (climate ambassadors), who also discussed about necessary local adaptation measures in Kempten with representatives of the city council.

#### **Hazards:**

Heat waves, heavy rain

## **Sectors:**

Urban Infrastructure, Health

## **Adaption Measures:**

Adaptation at school buildings (shading, ventilation, greening...), awareness raising among primary school pupils as well as high school students.

- Discussion of the proposed project with relevant stakeholders for approval (municipality, schools)
- Inform school headmaster about project details and identify teachers responsible for the project
- Purchase necessary materials (thermometers, UV-sensitive beads,...)
- Training for teachers (explain project schedule, ask for necessary individual adaptations)
- Adapt design of measurement forms (logo of school / municipality,...)
- Conduct measurements from March to July 2024: remind teachers of next measurement period and keep contact to resolve possible issues
- Support for preparing a presentation event: discuss with teachers how the pupils may present their results, coordinate opportunity, location as well as the contacts with the city administration and the city planning office
- Participate at the event (photos, videos, interviews, press and social media documentation)
- Evaluate results: collect measurement protocols and analyse temperature data to derive recommendations for improvement of the school buildings and classrooms
- Meeting with municipal building authority to discuss possible improvements of classrooms
- Final meeting with teachers, in order to evaluate measurements and results (also ask for suggestions how the project could be further improved)
- Implement improvement measures (press release and media PR)



*Figure 1: Info point on climate adaptation at the weekly market in Kempten and presentation of a certificate for the participating pupils by the climate management of Kempten*

### **Have you achieved the desired goal with the implementation of the pilot action?**

The objective of the project „sun detectives“ is twofold: one is to raise awareness among young people regarding climate adaptation and heat protection. And the second is to acquire temperature data in classrooms as a basis for improving the conditions in school buildings. This objective was achieved by the steps listed above and can be evaluated by following indicators:

- Number of pupils reached with the project: 160 pupils at two primary schools
- Number of analysed measurement protocols: 160 measurement protocols were analysed
- Number of people reached during the presentation event: Four classes presented their results at the municipal information point on climate adaptation at the weekly market in Kempten in July 2024.
- Number of press and media contributions: media coverage of the presentation event
- Recommendations for improving conditions in classrooms based on measurements were summarized in a project report and submitted to the building administration as well as towards the municipal climate management.
- Implemented improvement measures in school buildings: improvement measures are planned but not yet carried out (optimizing settings of ventilation and heating systems at schools, shading for schoolyards, etc.), control measurements after implementation, in order to evaluate improvements. Unfortunately, the currently tense financial situation of the city administration impedes any improvements in school buildings which imply higher financial investments.

### **Please describe shortly your regional dissemination event:**

- Regional event for municipalities participating in the European Energy Award program on 25<sup>th</sup> of September 2024 in Memmingen.
- Presentation of results of ADAPTNOW work package 2: implementation of pilot project „sun detectives“ in the pilot city of Kempten, development of a new service package for municipalities not yet involved in climate change adaptation and risk assessment (risk analysis, stakeholder engagement, action planning and communication in order to raise awareness on climate adaptation).
- Presentation of results of ADAPTNOW work package 1: information on already existing climate adaptation tools and ongoing adaptation projects (interactive tool „Klimacheck“ for analysing risks and vulnerability of municipalities, online based platform for simulating climate parameters in different climate scenarios until 2100, ongoing projects for climate-adapted forest restructuring and bog restoration).

### **Which recommendations can you give to other regions?**

- Preparation phase should start in January to conduct measurements ideally between April and July.
- Involve municipal authorities responsible for the school buildings early in the project in order to ensure a certain support for improvements in the school buildings after the project.
- Inform other schools about project results (in cooperation with the municipal education authority) and transfer the project to other schools
- Project report with recommendations for the school building based on measurements should be completed very quickly after the measurements. At least some low investment measures

should be implemented immediately after the recommendations are finalized, so that it becomes visible to all participating pupils what the project results are.

- Gain efficiency with a higher level of standardized processes when conducting the project at several schools.
- Less tense budget situation of the city would facilitate building improvements and therefore benefits for the participating schools.

## Pilot Plan b

### **Describe the second pilot action you have implemented:**

#### **Exemplary façade greening**

This model project for façade greening in Kempten was planned in cooperation with the University of Stuttgart and Fraunhofer Institute. After meetings with the city construction administration, a funding proposal for a research project with measurements of microclimatic effects and rainwater usage was planned by the University of Stuttgart. The selected building wall was the backside wall of the city-theatre in the city centre which is exposed towards the south directly adjacent to a smaller street. When the planning for the project implementation started, the first objections came from the monument protection authorities.

It turned out, that the façade greening represents a serious interference with the visual appearance of the original building wall and is therefore not permitted. Following this objection, the city administration was unable to find an alternative building for the planned façade greening. Because of that development the funding could not be applied for and therefore the whole project had to be stopped.

#### **Sectors:**

urban infrastructure, health

#### **Hazards:**

Heatwaves, Drought, Loss of Biodiversity

#### **Adaption Measures:**

Awareness raising among the citizens, greening of the city, exemplary character for adaptation in private households

#### **How did you implement the pilot action?**

- Meeting with city planning administration and climate management to present the project idea and with the objective to find a suitable building
- Identify possible municipal building in 2024 for façade greening (municipal theatre in the city centre); this task was carried out by the city planning department.
- Meeting with representatives of the University of Stuttgart and the city planning department and the climate management to discuss the project plan.
- Find agreement with the University of Stuttgart on the collaboration with regard to the planned research project and possible funding.
- Set up of funding proposal in close cooperation with the University of Stuttgart;

- Start implementation after approval of the funding (planned for Spring 2025).

**Have you achieved the desired goal with the implementation of the pilot action?**

The goal was to install façade greening elements to a municipal building in the city centre and use it as best-practice-example to inform inhabitants on measures to enhance biodiversity, prevent overheating of the city, etc. This would have been particularly emphasized by the extensive measurements of various environmental parameters within the research framework of the project.

Several meetings have been conducted between the urban planning department, the climate management and the University of Stuttgart. When the constructive planning for the project implementation started, the first objections came from the monument protection authorities.

It turned out, that the façade greening represents a serious interference with the visual appearance of the original building wall and was therefore not permitted. Following this objection, after further meetings with the concerned administrative departments the city administration was unable to find an alternative building for the planned façade greening. Because of that development the funding could not be applied for and therefore the whole project had to be stopped. A further obstacle was the increasingly poor budget situation and the associated austerity measures for the city administration. For this reason, there was no perspective to find another location for the façade greening project – especially without funding.

For this reason, the project could not be continued.

**Please describe shortly your regional dissemination event:**

Due to the fact, that the project was not continued, it was also not reported during our regional dissemination event.

**Which recommendations can you give to other regions?**

Since the project was cancelled due to the objections of the monument protection authority, we have the recommendation that it should be clarified that there are no such obstacles like monument protection.

Furthermore, the necessary finances should be clarified in advance and the necessary budget should be approved in the annual budget so that no unnecessary planning effort is incurred.

Otherwise, alternative funding needs to be raised.

## Region 5 | Plan B Region



Pilot Coordinator: Energy Institute Vorarlberg (EIV)

Pilot Support: Energy Institute Vorarlberg (EIV)

### Pilot Plan a

#### **Describe the first pilot action you have implemented:**

Our region consists of seven municipalities: Bregenz, Hard, Lauterach, Lustenau, Kennelbach, Schwarzach and Wolfurt. Since 2020, we have been a KLAR! Region. This means we are participating in a federal program that supports activities in the area of climate change adaptation. The coordination group meets three to four times a year. It consists of municipal employees, political decision-makers and, if necessary, experts.

In this group, the desire arose to take a closer look at possible natural hazards resulting from the intensification of climate change. After looking at various offers, we opted for the Austrian precautionary check for natural hazards in climate change. The precautionary check for natural hazards in climate change

offers municipalities the opportunity to reflect together with relevant municipal stakeholders on self-prevention measures within the community. This check deals with general natural hazards caused by climate change, hydrological and gravitational natural hazards. Two auditors came to the region to carry out the check. Precautionary checks took part on 21<sup>st</sup> and 22<sup>nd</sup> of November in the municipalities Wolfurt und Lustenau as 4 hours workshop.

### **Sectors:**

More frequent heavy precipitation, weakened forest due to drought and heat

### **Hazards:**

Heatwaves, Drought, Loss of Biodiversity

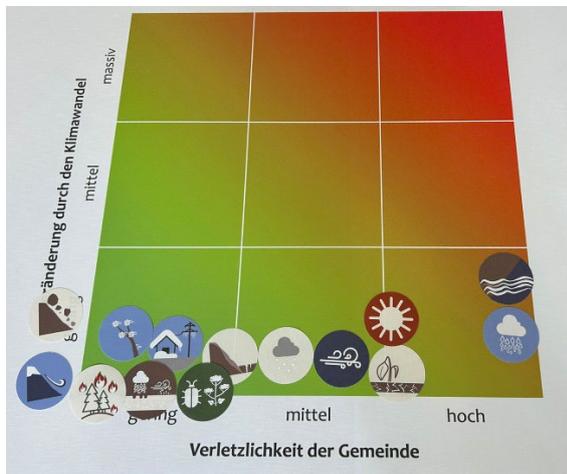
### **Adaption Measures:**

- Raise awareness among municipal decision-makers and stakeholders about locally relevant natural hazards and climate risks
- Strengthen risk awareness and precaution capacities in municipalities

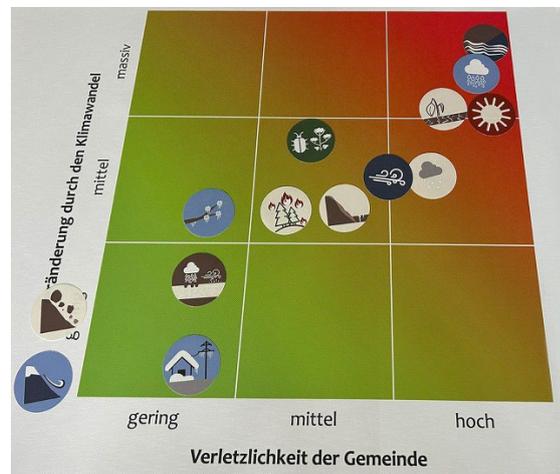
### **How did you implement the pilot action?**

In the run-up to the event, all participants got an invitation with brief information on the precautionary check for natural hazards in climate change. In both municipalities, there were participants from the emergency services organisations, municipal politics, environmental and waste management, facility management and the clear region manager.

In preparation, all participants were asked to complete an online questionnaire before the check in order to independently assess the municipality's exposure to various natural hazards in advance. As an introduction to the precautionary check, the participants discussed which natural hazards already affect the municipality in their opinion. The vulnerability of the municipality to these natural hazards was assessed in the group and the relevant natural hazard icons were localised accordingly on the natural hazard matrix (see example Lustenau).



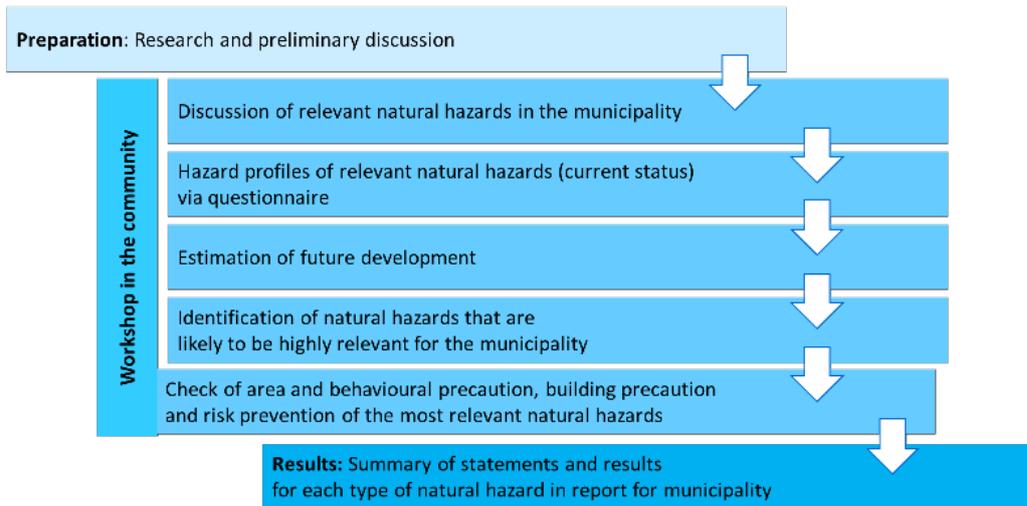
*Assessment of vulnerability at the beginning*



*and after the discussion*

In addition, the auditors' assessments were recorded and the precautionary strategies for various areas in the municipalities discussed in more detail. The auditors were Hans Starl (KAWUMMS Naturgefahrenmanagement GmbH – hydrological, gravitational natural hazards) and Verena Beiser (Energieinstitut Vorarlberg – climate-related hazards).

## PROCEDURE of the precautionary check



### Have you achieved the desired goal with the implementation of the pilot action?

The goals were

- Self-precaution: strengthening the competence and capacity of the municipality.
- Intensifying internal communication and coordination processes between departments and stakeholders in the municipality
- Comprehensive and structured discourse on the topic of natural hazards
- Focus on natural hazards affecting municipalities:
  - hydrological hazards (flooding/mudflows, heavy rainfall)
  - gravitational hazards (landslides, rockfalls, avalanches)
  - climate-related hazards (heat, drought, forest/grassland fires, storms, hail, lightning, snow/ice load, late frost, pests, erosion)

The results were achieved through the networking of the various professional groups in the municipalities and the intensive discussion of the risks with the help of the auditors. The increased risk awareness becomes visible in the matrices before and after the workshop. The stakeholders only realised their vulnerability in the course of the workshops.



*Precautionary check in Lustenau*



*Precautionary check in Wolfurt*

**Please describe shortly your regional dissemination event:**

In July 2024, an exchange between various energy institutes from Bavaria and Austria took place at the Energy Institute in Dornbirn. The occasion was an exchange between the AdaptNow and GoAltbau projects as part of the GO Altbau annual meeting.

GO Altbau actually deals with communication around the topic of refurbishment. However, the afternoon was dedicated to the topic of climate change adaptation. In addition to eza, the Bundeswehr University Munich was invited to give a presentation.

In this context, we were able to talk about our implementation of pilot projects and our plans for the service to raise awareness of damage to property. We reported about the planned Precautionary Checks in Wolfurt and Lustenau and gave a presentation about the Sun Detectives. We also explained to the Bavarian and Tyrolean energy institutes the steps we would like to take in Vorarlberg to introduce consultations for private homeowners. The other institutes then decided to send a member of staff to our training modules for energy advisors in the autumn so that they could set up similar training in their own regions.

**Which recommendations can you give to other regions?**

On a second occasion, we would try to dovetail our two pilot implementations more thematically. As we had one implementation in the municipalities with the professional groups involved in rescue operations and the other implementation took place in school lessons, there were no synergies. We also had to get very different people excited about the implementation, which meant a lot of work in different fields of action. The results cannot be passed on to the same target groups either. In this case, we were still lucky because we were able to disseminate them via other energy institutes.

## Pilot Plan b

### Describe the second pilot action you have implemented:

In March 2024 we started the implementation of the project “Sun Detectives”. This project aims on overheating in schools. We contacted all primary and secondary schools within our region. In the end there were six school participating, with 18 classes. In the KLAR! Region Walgau also 26 groups or classes were involved, so we ended up working with 44 classes and about 700 pupils. This region already participated in the testing in the year 2023.

The content of the project is overheating and managing raising temperatures. The participating teachers got teaching and training material. Each pupil got one thermometer and perls that react to UV-radiation. The idea is that the pupils do the temperature measures on the 21<sup>st</sup> of each month between March and June. This can be +/- some days, but it has to be a sunny day. Additional to the temperature measures the teacher describes the classroom in a form. At the end, this data were analysed by the EIV and the schools and staff of the municipality received recommendations for action. These could be improvements to the shading, improved settings on the ventilation system, greening measures, as well as tips for improved night-time cooling.



*Branded thermometer for all pupils*

### Hazards:

Heatwaves

### Sectors:

Urban Infrastructure, Health

### Adaption Measures:

Adaptation in school buildings (shading, ventilation), awareness raising among the pupils, greening of the city and adaptation in private households

## How did you implement the pilot action?

Right at the beginning of the project AdaptNow, we developed working materials for kindergartens, primary schools and secondary schools in cooperation with our education department. The aim was to sensitise the children to summer overheating in a playful way and to get a realistic assessment of summer use in the facilities through experimental temperature measurements.

In a first test run in spring 2023, the materials were tested in three kindergarten groups, four primary school classes and three secondary school classes. The children made bracelets out of "sun beads" and a sunscreen, got tips for proper ventilation on hot days and measured the temperatures on four sunny days between equinox and midsummer in the morning and at noon. The teachers' feedback on the materials was positive, as was the evaluability of the collected data. As a result, cost-effective solutions were discussed with the building authorities of the municipality.

Auswertung Sonnendetektive		
Einrichtung:	Schule Lauterach Unterfeld	Hinweise zum Gebäude:
Betreuer*in:	Sabine Beckmann, Klasse gelb	<input type="checkbox"/> Neubau
Orientierung:	1Stock / Ost	<input type="checkbox"/> Altbau
Fenster:	11,88 Quadratmeter Fensterfläche, 4 Fenster zu öffnen (Kindersicherung), 2 kippen	<input type="checkbox"/> Massive Bauweise
Lüftung:	gleich am Morgen vor dem Unterricht; tagsüber	<input type="checkbox"/> Leichtbau
Sonnenschutz funktioniert, wenn richtig eingesetzt		<input type="checkbox"/> Komfortlüftung
		<input checked="" type="checkbox"/> Fensterlüftung
		<input type="checkbox"/> Fensteröffnungen groß
		<input type="checkbox"/> Fensteröffnungen klein
		<input type="checkbox"/> hoher Dämmstandard
		<input type="checkbox"/> niedriger Dämmstandard
		<input type="checkbox"/> hoher Fensteranteil
		<input checked="" type="checkbox"/> niedriger Fensteranteil
		<input checked="" type="checkbox"/> Raffstore elektrisch gesteuert
		<input type="checkbox"/> Screen
		<input type="checkbox"/> keine Verschattung

*Evaluation template*

In the beginning of the year 2024, the pilot Sun Detectives was rolled out to educational institutions in the Plan B region. Schools in two climate change adaptation regions were approached and are participating in the programme with 50 classes and over 700 children in 2024.

The working materials and the questionnaire were sent to interested teachers at beginning of March to start the programme accordingly.

Every month between 21 March and 21 June, the children should measure the temperatures in their classrooms or group rooms in the morning and at midday. Together with pictures of the windows of the rooms and a few facts about ventilation and shading, as well as the orientation of the rooms, it was possible to assess the susceptibility of the rooms to overheating. The measurements of 15 classes were analysed. For others, the measurement results, answers to questions or photos of the windows were not sent back. Clearly, the rainy spring in 2024 put a spanner in the works. The outside temperatures never exceeded 20°C, even in June. Nevertheless, there were a few leads that should be followed up. Some classes have 26°C inside in the morning, even if the temperatures outside are much lower. When all the results were available, the teachers were informed of the results and provided with tips.

	Datum	Uhrzeit	Temperatur °C	Scheint die Sonne auf deinen Platz? (ja/nein)	Ist der Sonnenschutz vor den Fenstern? (ja/nein)	Außen-temperatur
1.	21. März (± 2 Tage)	morgens 8:00	22°C	nein	nein	1°C
2.	21. März (± 2 Tage)	mittags 10:54	24°C	nein	nein	7°C
3.	21. April (± 2 Tage)	morgens 8:00	23°C	nein	nein	8°C
4.	21. April (± 2 Tage)	mittags 11:30	22°C	nein	nein	13°C
5.	21. Mai (± 2 Tage)	morgens 8:10	21°C	nein	nein	10°C
6.	21. Mai (± 2 Tage)	mittags 11:30	23°C	nein	nein	16°C
7.	21. Juni (± 2 Tage)	morgens 8:15	24°C	nein	nein	11°C
8.	21. Juni (± 2 Tage)	mittags 11:30	26°C	nein	nein	20°C

Evaluation template for measured temperature

### **Have you achieved the desired goal with the implementation of the pilot action?**

We achieved our goal of sensitising pupils and teachers to the problem of overheating in educational buildings. Unfortunately, in the end, fewer classes took part than had initially registered. All the necessary materials were only returned by 15 classes instead of 50. The others were missing either pictures or measurements or the questionnaire. The second unexpected problem was the unusually cool spring of 2024, which never reached temperatures above 20°C until the summer. However, this will not prevent us from organising the Sun Detectives at schools and kindergartens again. As the materials were also used by eza in Kempten and there have been requests from other districts in Bavaria, the creation of the teaching materials has definitely been worthwhile.

### **Please describe shortly your regional dissemination event:**

See regional dissemination event pilot 1

### **Which recommendations can you give to other regions?**

The Sun Detectives awareness-raising programme is suitable for raising awareness among children aged 4 to 14 as well as educators and teachers. The educators and teachers did not provide all the necessary documents for an evaluation in the rolled-out programme. Perhaps they needed more support and a reminder. But perhaps the cool spring of 2024 was also to blame for the partly incomplete implementation.

A meeting with the mayor and the building authority after analysing the complete documentation is very useful in order to initiate an improvement of the situation in the classrooms. The fear of large investments is not automatically justified. In some cases, a lot can be achieved through different ventilation or the coordinated use of sun protection.

The materials have now been used in two KLAR! regions in Vorarlberg and two towns in Bavaria. As they are fully prepared, we are happy to pass them on to other countries that would like to translate them.

## Region 6 | Pilot Selnica, Podravje region, Slovenia



*Municipality of Selnica ob Dravi*

Pilot Coordinator: Energy and Climate Agency of Podravje (ENERGAP)

Pilot Support: Municipality Selnica ob Dravi, Regional Development Agency of Podravje Region,

Selnica ob Dravi is a small municipality situated in the valley of the large river Drava. Part of the municipality is in the valley, along the river, while the largest part of the municipality stretches over quite steep hills up to 1000 m above sea level. Many torrential streams, which are quite large, flow down the steep slopes into the river, along which there are inhabited gorges. The municipality is highly vulnerable and has not implemented any adaptation or resilience measures before 2020. Within the ADAPTOW project municipality has developed an adaptation action plan with adaptation measures linked to heavy rains, containing both organisational and technical - implementation and investment-related measures. The measures concern the protection of people and public infrastructure.

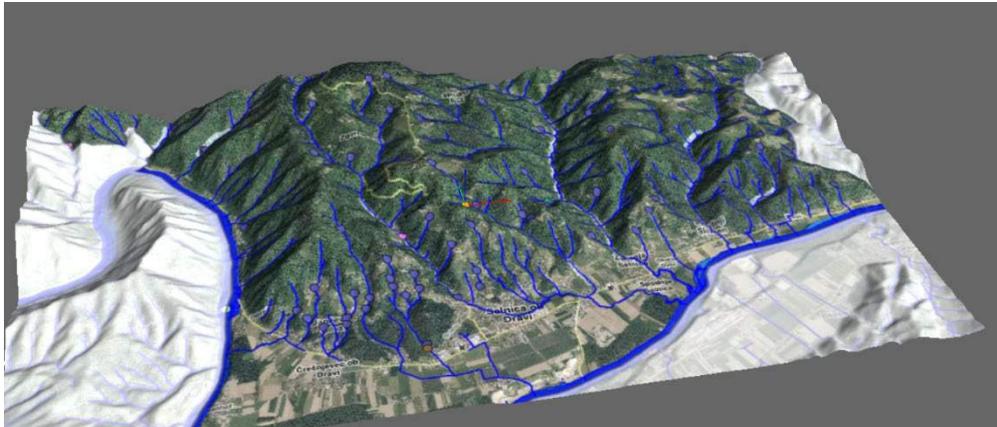
### Pilot Plan a

#### **Describe the first pilot action you have implemented:**

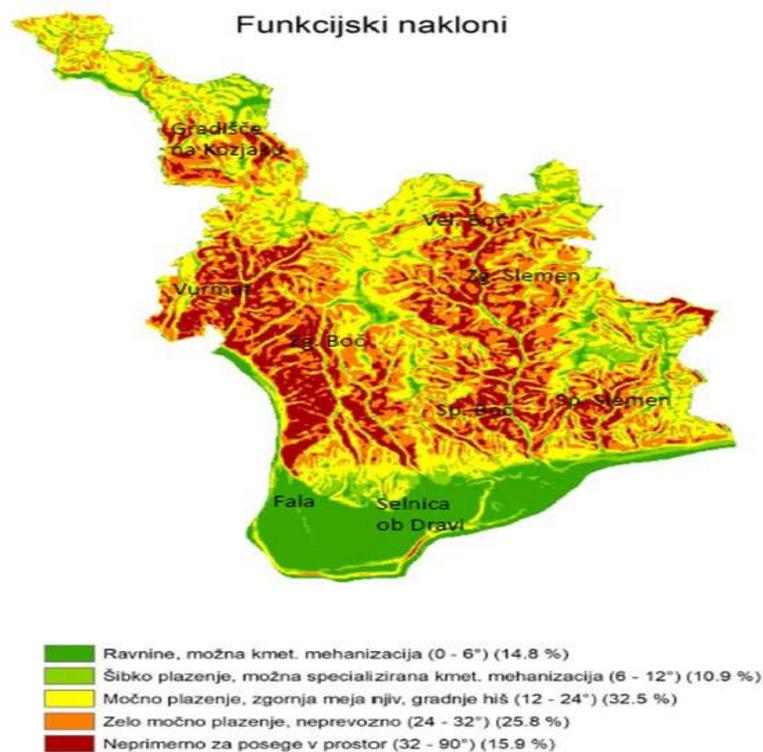
First pilot actions that were oriented towards better organized, coordinated and planned adaptation activities for the municipality to be more resilient. They were:

- identify and understand the risks in the region, evaluate the vulnerability and map potentially risky areas;
- map the stakeholders and engage them to understand the risks and help with defining the solutions and measures;
- list potential measures to be implemented: organisational, technical and investment;

- organize the stakeholders work and governance to enhance disaster preparedness for effective response;
- raise public awareness and understanding to influence people's behaviour in the case of emergency.



Water streams in Selnica ob Dravi



0 0.75 1.5 3 km

Vir podatkov: Geodetska uprava Republike Slovenije  
Izračuni, kartografija: Davidovič, Vovk Korže

*Selnica ob Dravi - Areas of high slope and prone to landslides marked with orange and brown*

### **Hazards:**

Heavy precipitation and gravitational hazards and landslides;

### **Sectors:**

Infrastructure (mainly roads, drinking water supply, houses)

This project is co-financed by the European Regional Development Fund through the Interreg Alpine Space Programme



*Landslides in Selnica ob Dravi, May and August 2023*

### **Adaption Measures:**

Following organisational measures were implemented:

- mapping the risk areas for floods and landslides;
- mapping and engaging the stakeholders;
- prepare action plan for heavy rains and floods;
- organise the work of the civil protection groups to be prepared when communication channels are broken down and when the disaster needs long term involvement of civil protection groups;
- informational and educational activities for stakeholders and civil society were organized.

### **How did you implement the pilot action?**

1. We have already started in 2022 with first activities to map and involve stakeholders. Different organisations and institutions were involved: water and forest authorities, civil protection groups, university, health care institute, Red-cross, infrastructure planner and maintaining companies, public buildings housekeepers, senior's associations and local groups of volunteers. Personal meetings were organized to discuss the risks and potential measures. In May 2023 important workshop was organized where all stakeholders together have discussed concrete steps for Selnica.
2. On the basis of their inputs and discussions municipality has drafted an action plan. According to the plan the measures has started to implement.
3. A list and a map of the riskiest areas were prepared. The citizens were asked to cooperate and to report or risky or vulnerable points or persons. The list of vulnerable people and infrastructure were prepared as well as potential places for short term housing in the case of emergency. The stakeholders discussed about each area how to reduce the risk and how to make it less vulnerable and how to act in the case of emergency. The most important actors

were Water Authority and Forest Authority. With each of them the meetings and discussions were done to make common understanding of the subject and to plan communication protocols for preparedness and for acting in the case of emergency.

4. In Slovenia there is very good organized system of preparedness for any disaster. Each municipality has civil protection groups involving people from fire brigades, health care, mounting rescues, divers, telecommunication professionals. They can effectively act when the disasters are not too big, lasting too long or affecting bigger areas. Therefore, the municipality together with civil protection group has established so call micro civil protection groups. These are the groups in decentralized and remote inhabited areas. They start to work by themselves if the communication with the central group which sits in the centre of the municipality is not possible. These micro groups know what they have to do, how to help people, where to find shelters if needed, which machines or apparatuses they have in the area to protect people and infrastructure. They are self-organized until the communication with the centre is operating again. Slovenia experienced a major climate catastrophe in 2023, when more than half of Slovenia was flooded. When we monitored the work of civil protection on the ground, we found that it is only well organised for cases where a smaller area is affected and neighbouring municipalities can help each other, and when such a hazard lasts only a day or two. The control operational centres that organised the work in the field had to work 24 hours or more continuously. After discussions after the end of the emergency, we realised that it would be very appropriate to have beds in the information centre so that people could sleep for a few hours in between and at the same time be ready to go into the field immediately if there was a need to go out and rescue. The municipality understood this immediately and purchased the beds already in 2024. This made it easier for everyone in the civil protection services, who are key to aid and rescue.
5. Many informational and educational activities for stakeholders and civil society were organized. Municipality has prepared different information for citizens about the climate changes, risks, vulnerability, resilience, self-protection and society activities and send them to all households and put them on webpage and social media. Members of municipal council as political decision-makers were regularly informed about the topic. Also workshops were organized for different target groups not only in the municipality but also on the national level *(for mayors, architects, building companies, local SMEs)*



*Workshop with experts, April 2024*

### **Have you achieved the desired goal with the implementation of the pilot action?**

The goals of the activities were:

- to identify risk and vulnerability in the municipality and start to plan and implement action for making the municipality less vulnerable and more resilient;
- to identify and organize stakeholders to work towards better resilience and help the municipality to implement all needed activities.

The goals were achieved through the strong and active cooperation and sharing the information and exchange of experiences. Municipal administration has also strengthened the position in the field of adaptation and adapt daily work to the topic of adaptation as a priority in the next years. Also, financial sources have to be assured in the municipal budget to implement the activities and be prepared to act fast and efficient. The activities in Selnica are presented at different events and occasions to show the work and get feedback. Selnica ob Dravi is one of the first municipality in Slovenia that has developed adaptation action plan and implement many activities in the organisational field.

### **Please describe shortly your regional dissemination event:**

Main dissemination events were held to spread the information and knowledge within the municipality and in the region:

- news and information were regularly published in the Selnica news – municipal newspaper sent to all 2000 households every 2 months, as well as on the web page and social media;
- info about the subject were presented regularly at the Municipal Council sittings;
- workshops were organized for companies, mayors and architects about climate change adaptation and building resilient society and infrastructure;
- pilot activities were presented at 3 very important national events (at Slovenian municipalities development days - a yearly conference for municipalities, at the meeting of Slovene Lady-mayors and at National conference of healthy cities), at 1 international event Urban future in Rotterdam 2024, as well as at some regional and local events. The local presentations were for companies, school and citizens;
- One of the most important events to present the activities was yearly Slovene Plenum of firefighters that was held in Selnica ob Dravi and where the highest political and operative persons from Slovenia were present. The importance of well-organized local civil protection group, good protocol and continuous cooperation are the key factors for building resilient society and this message was presented to the participants.

06.06.2024 | Nizozemska, Rotterdam.



ID: 1347411

Foto: Nebojša Tejić/STA

## Which recommendations can you give to other regions?

The most important recommendations are:

- Identifying and engaging the stakeholders is the most important activity to start the process as well as implementing the actions. It takes time to find all relevant ones – each person is important and in some cases one person can solve the problem or safe the situation.
- The stakeholders have to discuss and exchange the information frequently to be updated and in line with the status of the area in preparatory phase as well as if emergency occurs.
- The citizens have to be informed and aware of the potential risks and how they can contribute to make the municipality more resilient and which self-protection action they can implement. The information activities have to be often and continuous. The aim is that everyone understands the risk and vulnerability.
- Municipal administration has to put time, human resources and money to organize the stakeholders in the most appropriate way to achieve the best results.
- Continuous knowledge and experiences exchange activities to different target groups have to be implemented.
- Cooperation with regional and national organisations dealing with adaptation is important.



Two first pages of the Newsletters of The Municipality of Selnica ob Dravi with the information for the households and about sharing the knowledge with the mayors from the region

## Pilot Plan b

### Describe the second pilot action you have implemented:

The second pilot activities were implemented to show how the municipality could be less vulnerable and more resilient with the implementation of concrete legal, administrative and technical measures:

- preparing the local legal act and official protocol that protect the water streams from forest residuals and influence forest owners and managers to make adaptation measures;
- prepare roads maintaining standards to make roads more resilient to heavy rainfall and test them;
- preparing the trees maintaining protocols to make them more resilient to strong wind;
- greening the public spaces to reduce the temperature in summer – planning and implementing natural based solution in the build municipal central square.



*Fallen tree at the graveyard in Selnica ob Dravi, July 2023*



*Damaged road by heavy rainfall in Selnica ob Dravi, May 2023*

**Sectors:**

Infrastructure, health of citizens, economic developments including tourism

**Hazards:**

Heat Waves, Heavy Precipitation

**Adaption Measures:**

Some adaptation measures were prepared and tested to show how the municipality could be less vulnerable and more resilient with the implementation of concrete legal, administrative and technical measures:

- LEGAL: municipality has prepared the local legal act dealing with roads where specific protocol of permissions was established for forest owners and/or managers to take care

about the forest residuals that fall into the streams or closed to the streams and to keep the roads clean and maintained in the adaptive way. If the rules are obeyed, offenders may be punished;

- ADMINISTRATIVE and TECHNICAL: municipality has prepared roads maintaining standards to make roads more resilient to heavy rainfall. It includes the materials to be used and how and where the drainage systems have to be implemented. The standards are for the road maintain service providers. The work and results are daily checked;
- ADMINISTRATIVE and TECHNICAL: municipality has prepared a list of trees that are more resilient to strong winds due to their root system and the soil characteristics. The tree maintaining protocol was prepared for tree maintaining services when and how to cut the trees. Also, the recommendations for planting the trees next to public buildings have been prepared;
- TECHNICAL: The study and technical documentation were prepared for greening the public space to reduce the temperature in summer. As an example, the municipal central square will be changed from asphalt to green area.



*Forest residuals in the stream causing flooding and road damages*

### **How did you implement the pilot action?**

1. Together with forest and road authorities the municipality has prepared a legal act dealing with roads. In the act there is specific obligation and protocol that forest owner and/or manager have to take care that forest residuals are not left in the streams. Also, the wood is not allowed to be stored in the areas where the drainage systems is placed. Because of the very steep areas the small residuals have to kept in the way that heavy rain is not sweeping them down into the streams. Each forest owner has to notify forestry work to the municipality. Before, in-between and after the work the areas (water streams and roads) are checked to be properly cleaned and wood stored or removed. The information about the obligations and measures were sent to all forest owners and managers in the municipality to make them aware of the obligations. The municipality is checking the implementation regularly and at the same time make awareness activities for forest owners and users.
2. The municipality has many streams and valleys surrounded by steep hills. Usually, the roads in the valleys are very close to the streams. When heavy rainfall occurs, two situations arise which cause damage: the streams rise and erode the banks, destroying or flooding the roads.

The second situation occurs when roads become rivers or streams as a result of heavy rainfall. Technical measures should be aimed at regulating the strong banks of streams and allowing the water to flow freely along the road in heavy rainfall and to spill out in different directions depending on the terrain, without damaging the road. The desire is that when the rain stops, the water runs off and leaves the road undamaged. The first technical measure is related to natural based solutions to make the banks of streams resistant to strong water currents and waves. Various measures are taken to harden the banks and channel the water, and to channel the water into the resistant part of the stream or into retention basins or spillways. Both sides along the entire stream must be carefully checked to ensure that the measure does not cause damage on the other side or downstream. The second technical measure regulates the means and routes of run-off during heavy rainfall along or across the road. This means checking each road to see where there are possible water inflows, what gradient it has and to which side, where there are possible drains, where manholes are to be installed. We no longer put cross drains in the roads because they don't work when there is a lot of water, because there is too much water and it just flows over them. Where possible, we make larger ditches and drains along roads and pipes where necessary. We also put special material on unsealed roads that is wedge-shaped and gets stuck in the road and cannot be carried away so quickly by the water. The material is embedded and rolled into the road, not just embanked. The results show that this type of landscaping is the most resilient and causes the least damage. The measure is implemented in cooperation with the water authority and with landowners along roads and streams. This is very important in the case of drainage in the way that water is diverted to the spill fields. Care must be taken to ensure that these spill fields do not lead to houses. It is also important to channel water, if possible, to meadows or other agricultural land of a lower category. Avoid arable land, gardens and other plantations if possible. Road maintenance contractors are aware of the measures and supervised. Every road is inventoried and after each rainfall event we check the condition of the road and whether the measures have been successful.

3. The municipality has not faced strong winds in the past. We are a green municipality and we also have a lot of quite tall trees in the settlements, also very close to buildings, because people like shade. In recent years, the municipality has also been experiencing increasingly strong winds, which have been knocking down trees and falling on houses, roads and other infrastructure. Therefore, the municipality, in cooperation with the Forest Authority, has drawn up a list of trees that are more resistant to strong winds because of their root system and the soil characteristics. These trees will be planted in public spaces in the municipality in the future. We have also made this list available to people so that they can use it for private land. We have also introduced a rule that trees are planted at least 15 m away from buildings and that they do not exceed 15 m in height. In the past, the municipality also did not have a protocol for tree maintenance. All trees grew freely in height and width, and only a few were regularly pruned and topped to prevent growth in height. Now the municipality has a protocol in place to regularly inspect and, if necessary, prune trees up to 15 m in height in settlements and public spaces. This protocol is communicated to the municipality's green space management service. This way, we are better prepared for strong winds and trees are more resilient or will cause less damage if they are cut down.
4. The municipality has a central square where asphalt has been laid for more than 50 years. Cars have been driven and parked on the square. The space was not suitable for people as

there was a risk of traffic accidents. There was also no space to install benches for sitting. During spring, summer and autumn days, the space was also not suitable for people or animals, as it was already overheated and very hot at normal temperatures. The municipality decided to show how public spaces can be cooled down. Together with experts in sustainable design, we came up with a conceptual solution that involved closing the square to vehicles, creating a rain garden and planting trees and other vegetation to provide coolness, humidity and shade. In 2024, the municipality has closed the square to vehicles and prepared all the necessary documentation for the infrastructure. It has worked with green space experts and the Cultural Heritage Authority, as the square is a cultural heritage site. In 2025, the municipality is carrying out the first part of the redevelopment. This means that it will create a so-called rain garden in the south of the square, which will have a retention basin and will also serve as a storm water drainage area. Two shade trees will be planted alongside this garden. Benches will also be installed in this area. Most of the people are happy with the closure of the square and planned interventions. The owner of the café was a bit unhappy as he thought he would have fewer customers. The municipality has had several meetings with him and explained and showed the examples of good practice in other places. He also admitted that he had no guests in the intense heat. The municipality has offered him to have part of his place under the trees so that he can have guests even in very hot weather. The municipality also presented the plaza to citizens and municipal councillors and they agreed that we need to green up public spaces in the face of increasing and more prolonged heat waves. The municipality will also continue to improve the park next to the kindergarten in a sustainable way. It has already commissioned the project documentation. Greening green spaces in a sustainable way and in a way that is adapted to climate change also has an impact on greater social inclusion and the quality of social development, which is a very important factor in the municipality. The municipality is also spending more money every year on green spaces. The businesses in the municipality also agree with greening the area. One of the larger companies in the municipality has already planted an avenue along the road by the school.



*The tree line planted by company ATEA Group from Selnica ob Dravi*

### **Have you achieved the desired goal with the implementation of the pilot action?**

The goals of the pilot action were to prepare some legislative, administrative and technical measures to be implemented within 3 years project period and the municipality has achieved it through strong cooperation with the citizens and raising the knowledge of all stakeholders. Beside the direct results there were many other achievements linked to the goals. The municipality was able to implement the measures together with the stakeholders. It was a learning experiences for all involved like municipal staff, experts and services providers. The municipality is monitoring the results, discussing and exchanging the experiences with users or beneficiaries to see the results of the measures, if they have to be improved or changed. Within these activities many educational and information activities were

done. The stakeholders have understood that part of the work is a process of learning and doing. All measures have been evaluated and it will continue to be in a long-term.



*Making the roads in Selnica ob Dravi more resilient*

### **Please describe shortly your regional dissemination event:**

Main dissemination events were held to spread the information and knowledge within the municipality and in the region:

- news and information were regularly published in the Selnica news – municipal newspaper sent to all 2000 households every 2 months, as well as on the web page and social media;
- info about the subject were presented regularly at the Municipal Council sittings;
- workshops were organized for companies, municipal staff and services providers about climate change adaptation and building resilient society and infrastructure;
- pilot activities were presented at 3 very important national events (at Slovenian municipalities development days - a yearly conference for municipalities, at the meeting of Slovene Lady-mayors and at National conference of healthy cities), at b1 international event Urban future in Rotterdam 2024, as well as at some regional and local events. The local presentations were for companies and citizens;
- the measures were presented at the workshop about Sustainable tourism where resilient roads and green areas are becoming more and more important as well as well-organized civil protection system. The tourist like to fill safe when on a holiday. The article how the adaptation measures are linked to sustainable tourism and development were prepared to raise awareness also in this sector;
- the experts and service providers in road building and maintain sectors from other municipalities and regions are visiting Selnica to see how the system is working.

### **Which recommendations can you give to other regions?**

The most important recommendations are:

- The cooperation with the stakeholders and experts in the field is very important, especially for maintaining standards. Usually, standards are very technical therefore the adaptation measures have to follow some standards and role and together they have to find a way to adapt.

- Check and evaluate regularly the results and consequences of adaptation activities and improve or adjust them if needed. It is continuous, long term activity because the climate changes are changing over the time as well as people and ecosystems.
- When calculating the cost of the measures for adaptation always look at the future cost if you do not implement the measure and you will see that you will save a lot of future money if you implement a measure.
- The adaptation measures are linked to many sectors. When you discuss about the need to implement it show all links to other sector. Like roads – they are linked to companies, health care issues, tourism, going to school, get veterinary service and other. Inform people about it.
- Even if the measure is very technical inform and educate people and citizens to understand. With more knowledge they will be able to understand it and even repeat it at their own property.
- Prepare a photo and drawing materials when presenting the changes. Many people understand better when they see a picture.
- Make step by step changes if possible. Citizens have to get used to the new organisation or place of living.
- Discuss a lot with political and other decision makers and give them time to understand, react, get involved and make contributions. For example, when working on the roads in the forest – talk to forest managers, hunters, fishermen, ...
- Discuss about the measures that went wrong or not went according to the plans or do not have the results. Also, wrong or bad practices are good to know to be able to make better proposals.
- Municipality has to initiate the activity and be as a show case for others.
- Working together with the citizens on adaptation can strengthen the community. Disaster risk reduction is a team effort.



*Selnica ob Dravi main square before the closure and after and it is waiting to be green in 2025*

## Region 7 | Genoa, Italy

Pilot Coordinator: Municipality of Genoa

Pilot Support: IRE Liguria S.p.a.

### Pilot Plan a

#### **Describe the first pilot action you have implemented:**

Partnership with the University of Genoa aimed at researching hazard related to windstorms, seastorms, heat/cold waves in order to produce hazard maps.

#### **Hazards:**

Windstorms, Seastorms, Heatwaves, Cold Waves

#### **Sectors:**

Urban Infrastructure; Health; Tourism

#### **Adaption Measures:**

Updating of the Civil Protection Plan with new measures that will reduce risks from the three hazards considered. SH's proposals will be taken into account together with data from the new maps.

#### **How did you implemented the pilot action?**

The research for hazard maps is already ongoing; the update of Civil Protection Plan will begin at the end of the project, once we have all the technical information available.

#### **Have you achieved the desired goal with the implementation of the pilot action?**

Maps will take more time than project duration to be produced, mainly due to computational reasons. Hazard maps for seastorms are ready for multiple combinations of variables. Regarding windstorms and heat waves, hazard maps are ready in targeted areas, as contracted with University. The research will continue in next months in order to produce maps in the whole area of the city.

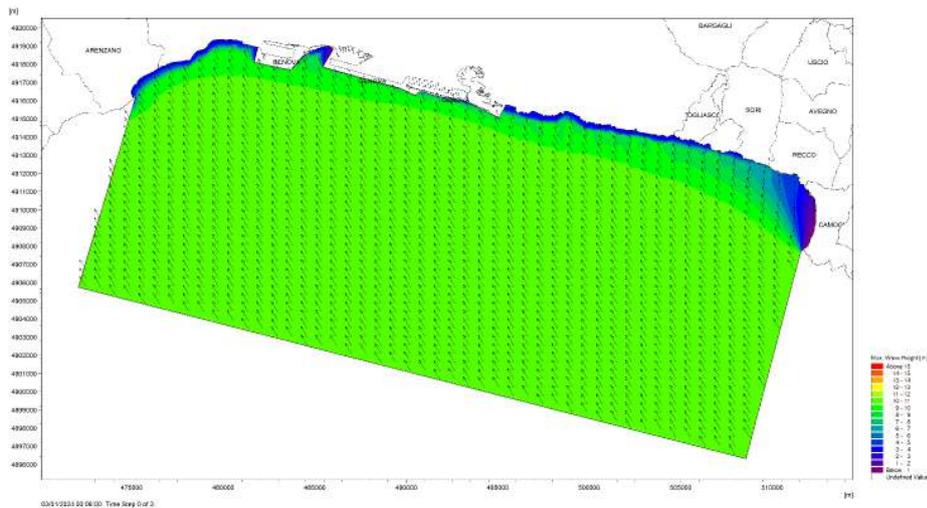


Figure 1: Seastorm model for maximum waves approaching the coast of Genoa from SE direction for 100-year return time

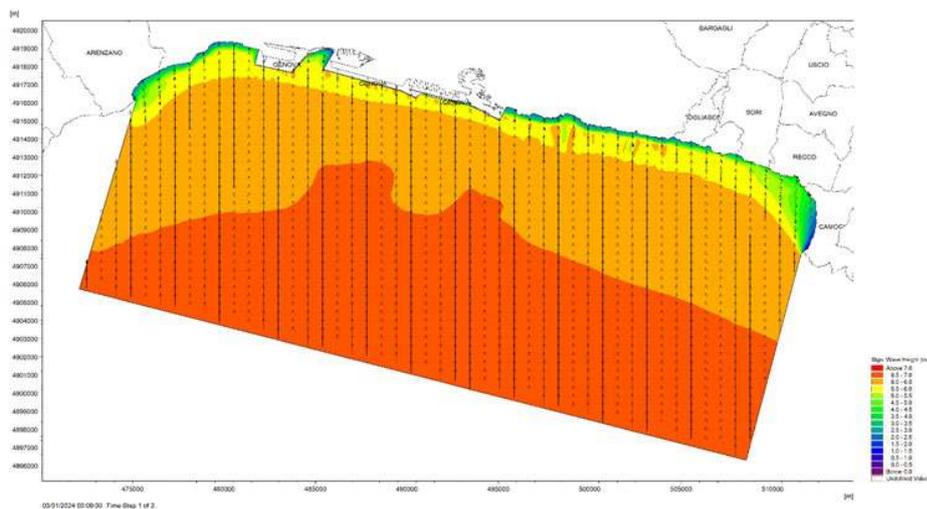


Figure 2: Seastorm model for maximum significant waves approaching the coast of Genoa from S direction for 100-year return time

**Please describe shortly your regional dissemination event:**

CDG organized two dissemination events involving citizens in the spreading of project results and a risk perception questionnaire (climate service). The event took place on 20<sup>th</sup> March and will be replicate on 27<sup>th</sup> March in San Lorenzo Square, located in the core of Genoa: during the event citizens can discover the pilot work, fill in the questionnaire and give suggestions for the plan implementation and communication activities related to the hazard maps.

**Which recommendations can you give to other regions?**

One of the main faced problems during the processes is related to the lack of participation of stakeholders - especially the external ones such as regional associations or professional orders -, mainly related to absence of awareness about their roles and climate change effects on their territory. Municipalities and Regions should work on concrete involvement of stakeholders by defining clear objectives and an involvement plan, also through facilitators.

## Pilot Plan b

### **Describe the second pilot action you have implemented:**

A high resolution wind model in the urban area aimed at improving short-term forecasting and possibly reducing road and green spaces closures. New wind sensors will be installed in the areas that the hazard maps will show to be the windiest, in order to improve the real time monitoring, while the forecasting model will help us in evaluating the risk level in advance.

### **Sectors:**

Urban Infrastructures, Tourism, Health

### **Hazards:**

Windstorms

### **Adaption Measures:**

Updating of Civil Protection Plan, improvement of wind monitoring and forecasting, definition of more specific actions to avoid non-useful and unpopular preventive closures of areas of the city.

### **How did you implement the pilot action?**

The research for the high resolution wind model is already ongoing; the update of Civil Protection Plan will begin at the end of the project, once we have all the technical information available.

### **Have you achieved the desired goal with the implementation of the pilot action?**

The development of the model will take more time than project duration, since it is consequent to the production of hazard maps.

### **Please describe shortly your regional dissemination event:**

The dissemination events that took place on 20<sup>th</sup> and 27<sup>th</sup> of March regarded all the pilot actions of the project.

### **Which recommendations can you give to other regions?**

Regarding this action, it is fundamental the collaboration with other public entities. In fact, these instruments could be useful for multiple public authorities and could be important the signature of specific agrees.



*Figure 3: 20/03/2025:  
Dissemination of project  
activities and climate service  
for citizens.*