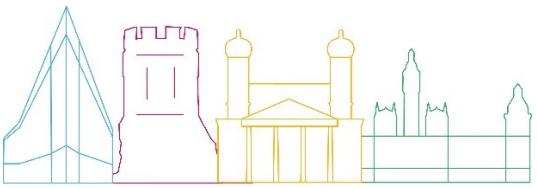
ARCH D3.7 Case studies report

Experiences and lessons learnt



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1.0	2022-08-29	MvM	Initial submission
2.0	2023-03-03	LA	• Added new subchapter 3.1 with explanation of the risk scenarios co-creation for ARCH tools • Included a matrix relating all Mutual Learning cities to comparable hazards in chapter 9 • Added reflections on generalisation of tools and relevance for replication among outcomes (chapter 10.3)

Executive Summary

This deliverable has been prepared for the European Commission-funded research project ARCH: Advancing Resilience of historic areas against climate-related and other hazards. It is the key output of Task 3.7 "*Experiences and lessons learnt*" within work package 3 "*City cases – Co-creating resilience and sustainable historic areas*". The aim of Task 3.7 was to reflect on and analyse the experiences that the foundation cities had during the project, including obstacles and lessons learnt, as well as local activities of the foundation cities.
The project team has developed seven tools to help cities protect areas of cultural heritage from hazards and risks. These were co-created with the foundation cities to test them and produce practical results that can be applied in the cities.

To understand and learn from the cities´ experiences, this report includes the different activities and conclusions that can be drawn from them. It reflects on the project activities with the four foundation and the twelve keystone cities.

Overall, the ARCH project showed that co-creation activities involving city partners and if possible, local stakeholders within a project is crucial to produce results that are of use and tested along their development which makes it also more effectively than to adjust the results after their finalisation.

During the ARCH project, face-to-face meetings held at the beginning to get to know each other and develop a common understanding and vision of the project were one of the most important factors for a successful co-creation. In addition, it was important to address the translations needed and to plan resources and time for the translations during the co-creation activities. Resources and time were also needed to include site visits in the co-creation events, which allowed for a better understanding of the focal locations and a connection to the project theme. Largely due to Covid 19 pandemic, the use of more innovative and new tools such as online whiteboards and surveys increased and improved effective co-creation of tools and opportunities to work together on different tasks and issues.

The main impacts of the ARCH project were the creation of new jobs or the safeguarding of existing jobs and the increase in awareness of cultural heritage, climate change impacts and adaptation and their interrelation.

Updates in version 2.0 from March 2023

This second version of the deliverable was produced after the final review of the project in November 2022 upon request of the reviewers. It adds i) a new subchapter 3.1 with explanation of the risk scenarios co-creation for ARCH tools, ii) a matrix relating all Mutual Learning cities to comparable hazards in chapter 9, and iii) reflections on generalisation of tools and relevance for replication among outcomes in chapter 10.3.

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List of Abbreviations

Abbreviation	Meaning
DSS	Decision Support System
ENEA	National Agency for New Technologies, Energy and Sustainable Economic Development
FHH	Free and Hanseatic City of Hamburg
Fraunhofer	Fraunhofer Society for the Advancement of Applied Research
HArIS	Historic Area Information System
ICLEI	ICLEI Local Governments for Sustainability
INGV	National Institute of Geophysics and Volcanology
MUOP	Municipal Institute for the Protection of Monuments in Bratislava
RAD	Resilience Assessment Dashboard
RMI	Resilience Measures Inventory
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan
SOGESCA	Environmental and Energy Engineering and Consultancy
Tecnalia	Fundacion Tecnalia Research & Innovation
THIS	Threats and Hazard Information System
UNIBA	Comenius University Bratislava
UNICAM	University of Camerino

1. Introduction

During the ARCH project, tools and methodologies for climate and hazard-resilient historic districts were developed together with the four foundation cities of Bratislava (Slovakia), Camerino (Italy), Hamburg (Germany), and Valencia (Spain), in a co-creative approach. Where possible and reasonable, local stakeholders e.g. policy makers, practitioners, and community members were involved in the activities or informed about project objectives and the outcomes. In addition, a total of 12 additional cities were involved in the project activities during the Mutual Learning Workshops. The co-creation activities were organised and led by ICLEI under Work Package 3, of which this report is a part.

Various challenges outside the project itself have put its co-creation activities to the test. In particular, the Covid 19 pandemic had a major impact on the collaboration of partners inside and outside the project, as the restrictions prohibited or limited planned face-to-face events and led to more online meetings. In addition, there were several other challenges that had to be addressed and overcome, as well as successful activities and developments during the project collaboration, which are presented in this report.

The effective and regular involvement of urban partners was crucial to the success of the ARCH project, ensuring valuable results and the development of practical tools for the cities involved, as well as opening up discussion on the transferability of results to other contexts.

The aim of this report is to give an overview of the co-creation activities carried out during the project period and the main findings as well as the impact of the project on the foundation city partners and their work. These findings may be useful for other projects that will involve urban partners and co-creation as a principle of working together on a multi-partner project.

1.1. Structure of this report

This report is structured as follows. Chapter 1 explains how the gender dimension was included in the co-creation activities, the linkage with other results, the purpose and target group of this report, the methodology used and the structure of this report. The second chapter deals with the guide for the co-creation approach and the six different co-creation principles. Chapter 3 presents the four different founding cities. Chapters 4, 5, 6 and 7 look at the background of each of the four foundation cities (Bratislava, Camerino, Hamburg, Valencia) and provide an update on the current governance of cultural heritage, disaster risk reduction and climate adaptation when new developments and relevant publications have appeared in recentmonths. The eight chapters highlight the identification and involvement of local actors in eachfoundation city and include a brief summary. Chapter 9 presents the mutual learning framework and workshops. The main barriers and facilitators to co-creation in the ARCH project are presented in chapter 10. A final brief conclusion is drawn in chapter 11. The last chapter number 12 showcases the resilience assessments of the historic areas in the four foundation cities using the ARCH RAD tool.

1.2. Gender mainstreaming approach

This report has been developed with regard to the guidance provided in the ARCH Project Handbook (D1.2, Part 7) with respect to gender aspects in publications and research. The report has been produced using gender inclusive language.
In meetings, events and surveys, as well as in other activities related to co-creation, it was important to take into account the gender of participants and to aim for a balanced distribution. When this was not possible, this was communicated and the results were interpreted with the awareness that they might be biased.

1.3. Relation to other deliverables

This deliverable is mainly related and connected to the following other deliverables of the ARCH project:

- **D3.1 Guideline on ARCH co-creation approach**
  The ARCH co-creation guideline specifically targets the collaboration between scientific and non-scientific partners within the consortium. The utilisation of the ARCH co-creation approach should be taken into consideration when analysing and reflecting on the co-creation activities in this deliverable. Here, reflections on the effectiveness of the collaboration are a part of D3.7.

- **D3.2 ARCH local partnerships and workplan for each pilot city**
  The summary of the stakeholder mapping and the engagement plan as well as the achievements within local work plan are used to reflect on the activities and to involve local stakeholders of each pilot city.

- **D3.3 ARCH city baseline report**
  The city baseline report presents the four foundation cities of the ARCH project and their characteristics as well as main threats and hazards. Some of them are also presented in this report as an introduction. The most relevant governance structures and documents regarding the cultural heritage, disaster risk reduction and climate adaptation of the cities are also part of the city baseline report. Wherever it was necessary to update the current status and include new strategies, plans and other policy papers on governance of the city partners, this has been included in this report.

1.4. Purpose and audience

The objectives of WP3 "*City cases – Co-creating resilience and sustainable historic areas*" are to develop the co-creation framework and guidelines of the project, ensure that the results are relevant and useful for the foundation cities, local partners and community members. Furthermore, a group of keystone cities was engaged in different activities, especially in capacity building and knowledge exchange during workshops and other events as well as raise awareness.

The purpose of this report is to:

- give an overview of the challenges and gaps in the city baseline report and add new developments of the institutional and regulatory framework in each one of the foundation cities
- describe and summarize the implemented local activities of the foundation cities in the project
- assess the (co-creation) activities within the project – including enablers, obstacles and solutions
- include an overview of the groups involved in the activities and assess their participation (what are the conclusions and recommendations from the ARCH project?)
- analyse and reflect on the direct and indirect impacts of the (co-creation) activities (e.g., impact analyses, impacts within and outside of the project)
- create a useful case study report which is of interest for other (local) stakeholders working in the field of (urban) resilience and cultural heritage

Overall, lessons learnt are a way to highlight the strengths or weaknesses of a project in working together, the preparation of activities, their design, as well as the testing and implementation of methods and tools.

The target audience of this report is local stakeholders and practitioners such as disaster risk managers, managers of historic sites, or climate change managers, as well as interested residents. Technical staff in local or regional governments and policy makers as well as researchers dealing with disaster risk response, civil protection, climate change adaptation, and heritage conservation may also be interested in reading this report.

1.5. Methodology

The main source for writing this deliverable are documents, agendas, results of co-creation workshops and events that were produced over the time of the ARCH project. Therefore, the methods used were literature and document review as well as analyses of the impacts. Throughout the project, all main events and meetings were documented by noting the meeting agenda, the main outcomes and the participants.

Generalizations based on the experiences with the different partners and during the project activities were made to simplify the described experiences and make them more understandable and accessible for the reader. The main findings and impacts of the co-creation activities have been summarised and not presented for each city individually, as most of the findings are shared between the city partners and it is easier for the reader to get an overview of all the lessons learnt and recommendations of the project.

2. Reflections on the guideline on co-creation approach

The ARCH co-creation guideline specifically targets collaboration between scientific and non-scientific partners within the consortium. The ARCH co-creation approach should be taken into consideration when reflecting on the co-creation activities in this deliverable. Here, reflections on the effectiveness of the collaboration are a part of D3.7.

The D3.1 guideline on ARCH co-creation approach was created end of 2019. It defines a common vision as well as principles and a practical framework on how to work together within the project. Furthermore, it includes a chapter on how to deal with obstacles if they occur.

In total, six basic principles were set and agreed upon within the consortium. Building on the ARCH experience, these principles can be the foundation for future work in the field. The mentioned principles are the following.

Equality

The co-creation activities involved everyone involved in the activity. It was important to listen to the opinions and additions of all partners and to involve them in both the work and the outcome of the exercise. Although the meetings and activities were designed to allow time for questions and discussion, some partners mentioned that more time was needed to share ideas and discuss different issues. This feedback was considered in the next meetings and activities. However, due to the limited time capacities and also the different time possibilities of the individual project partners, this could not always be achieved to the satisfaction of all participants. At a minimum, it was ensured that everyone who wanted to ask a question or make a comment was heard and topics that were too complex and lengthy discussions were taken up at the next meeting or activity so that everyone's opinion and contribution was heard. This ensured that the agreed principle of equality was respected and that no one was excluded.

Openness

During the project, the main consortium partners were very active and engaged. Due to work on other parallel projects, it was difficult for some partners to attend some meetings or events. This obstacle was removed and when possible, meetings and activities were scheduled so that everyone had time to attend. It was also checked who of the partners must attend the activity and who could attend voluntarily. Overall, this strategy was successful. In the summerof the final project year, several face-to-face meetings were planned and carried out. This ledto time constraints due to insufficient capacity. One way to deal with this was to engage at least one representative from the partner organisation and to inform each other before the event. If this was not possible, also due to illness or postponed flights, the other project partnersstepped in and took over the tasks.
The knowledge acquired was shared between the partners and when sensitive data was collected, all partners concerned were involved in the discussion on what and how this information should be made public. This way of working together openly showed that the trust among the project partners was successfully developed over the time of the project.

Transparency

All partners shared information and results during the project with the project partners and beyond, where appropriate. Some of the planned activities had to be changed and adapted due to lack of capacity and time or changing needs of the project partners. In almost all cases, the project partners communicated transparently about their tasks and boundaries. When this was not the case, the task, work package or project management approached the project partners and bilateral as well as broader (regular) group discussions were always helpful to clarify the status of tasks and identify (potential) obstacles.

Flexibility

External factors such as the pandemic (e.g. illness, postponed or cancelled events) as well as internal factors (e.g. staff changes, tasks in other projects) have led to some barriers to collaboration. These challenges were overcome by, for example, talking about shifting time frames or responsibilities within the project partner team and changing the original plan from physical to online meetings. Such flexible project work was only possible because the project partners were open and trusted each other, and because everyone strived for a solution that suited everyone involved. The flexibility was also necessary to ensure valuable results for the urban partners, as some priorities changed over time and some planned activities were tailored to the local context (e.g. background and number of local stakeholders involved) to be more effective, which mostly had to be changed by the technical partners. Overall, the project partners were very successful in adapting their plans and activities, even if this meant that they needed more time and more capacity.

Inclusiveness and reflexive / iterative learning

This principle is closely linked to two others: openness and transparency. It also focuses on the involvement of all (relevant) partners. However, the aspect of reflexive and iterative learning is an additional aspect that was very important for the success of the project. One of the main objectives of co-creation is to create and test new processes, tools and activities in order to achieve valuable and practical results. The main driver for iterative learning in the co-creation activities in the project was the regulations due to the pandemic. Partners had to learn how to use new online tools and software and set up a suitable working environment at home due to several lockdowns. Planned events also had to be changed and were held mainly online. This was a learning process for all involved. After some time, all partners were used tothe online activities and software used for collaboration (e.g. video platforms, online whiteboards and online surveys). During the testing and development of the tools by all projectpartners, iterative learning was also required to make them suitable for the needs of the urbanpartners (and local stakeholders). This process was very effective and successful, and tools were created that are useful and practical for the urban partners.

Trust, accountability and credibility

During the project it was clear who was working on which tasks and who was responsible for which activities and decisions. Even after changing responsibilities or staff, it was ensured that the team and other project partners were informed. As most project meetings took place online, there was not always the possibility to exchange in an informal way. Therefore, trust-building activities such as dinners, extended breaks and site visits were only possible a few months

before the end of the project, e.g. during the General Assembly in Rome and the Stakeholder Dialogue in Thessaloniki. However, the openness and willingness to overcome obstacles that arose led to a trusting working atmosphere among each other, even if this could have been even more intense with more regular face-to-face meetings. Some of the set deadlines could not be met, and the discussions with the project partners always made it possible for the results to be successful, even if the deadlines were postponed. These adjustments were necessary mainly due to the increase of other tasks also outside the ARCH project, illness or temporary drops in capacity.

While working together on a regular basis, the co-creation guideline was not often directly included in the discussions. However, during the Stakeholder Dialogue, the co-creation guideline was used as a basis for a session with the consortium and the keystone cities. In three different groups, the participants were clustered with at least one foundation city and discussed the given co-creation principles and to what extent they were successfully integrated in the project work and if there were some challenges to work together.

Even if the guide was not present during the daily work, it was helpful to come back to it when obstacles arose. Also, the process of talking about the common co-creation principles and agreeing on the practical framework provided the project partners with a basis that made it easier to spot obstacles and stick to the agreed principles.

3. Setting the scene – foundation cities

The following chapters present the main co-creation activities done with each foundation city, the main needs and differences between the four foundation cities as well as the mutual learning framework and the workshops conducted.
The table below offers a brief summary of the more detailed accounts in chapters 4 to 7.

City	Bratislava	Camerino	Hamburg	Valencia
Focus area	Devin Castle and themedieval town centre(Celtic pottery kiln -Apponyi House, Celticmint - Palffy palace,Celto-Roman structures - BratislavaCastle, Saint James´sChapel and Fisherman´s Gate)	Old Town, especially the Ducal Palace and Santa Maria in via Church	UNESCO WorldHeritage "Speicherstadt, Kontorhaus Districtwith Chilehaus"	The Huerta and the Albufera
Characteristics	Devin and Old Town borough (Single buildings)	Old Town (Single buildings)	UNESCO World Heritage site and former harbour with brick warehouses (Single buildings)	Two large cultural landscapes
Main hazards identified	• Extreme precipitation • Fluvial flooding • Extreme heat • Insect infestation	• Earthquake • Climate hazards	• Extreme precipitation • Tidal changes • Storm surges	• Flooding • Wave action • Convective storm • Extreme heat • Drought • Insect infestation

Table 3-1: Comparison of the four foundation cities and their main characteristics and hazards

3.1 Context: ARCH tools and co-creation

A co-creation process involving project partners and relevant stakeholders guided and informed the development of the ARCH tools, and particularly the following:

- ARCH Historic Areas Information System (HArIS) and Threats and Hazards Information System (THIS)
- ARCH Resilience Assessment Dashboard (RAD)
- ARCH Decision Support System (DSS)
- ARCH Resilience Measures Inventory (RMI)

This report will present the activities developed to this end. In this context, only a list of selected impact scenarios have been analysed and co-created, according to local interest and relevance. The selection has been part of the co-creation process and supported by the use of the ARCH Risk Scenario Toolbox. This is a set of tools and methods to support the co-identification, co-prioritization, and co-definition of risks, impacts, and the cause-effect relationships between them. The resulting toolbox consists of: (i) a risk profiling table; (ii) a scenario prioritization tool and; (iii) a Miro-Virual whiteboard template for the creation of Impact Chains.

4. Bratislava

As mentioned above, chapter 4 highlights the main characteristics of the city of Bratislava. It includes new or missing governance documents compared to the deliverable "*D3.3 City baseline report*" [1]

The aim of this chapter is to briefly introduce the city of Bratislava, the focus areas, the main hazards and risks as well as the main objectives that have been achieved within the ARCH project.

4.1. Localisation and state of the heritage assets

The city of Bratislava is the capital city of the Slovak Republic with a territory of 367.66 km^2 with a population of 324,703 [2]. Bratislava is one of the youngest European capitals [3].

The city is divided into the following five administrative districts:

- Bratislava I – consists of City Borough Stare Mesto
- Bratislava II – consists of City Boroughs Ruzinov, Vrakuna and Podunajske Biskupice
- Bratislava III – consists of City Boroughs Nove Mesto, Raca and Vajnory
- Bratislava IV – consists of City Boroughs Karlova Ves, Dubravka, Lamac, Devin, Devinska Nova Ves and Zahorska Bystrica
- Bratislava V – consists of City Boroughs Petrzalka, Jarovce, Rusovce and Cunovo

The 17 city boroughs of Bratislava are governed by an elected local government and an elected Mayor.

4.1.1. Focus sites in Bratislava

The focus sites within the ARCH project are in Devin City borough and Stare Mesto, the later means old town.

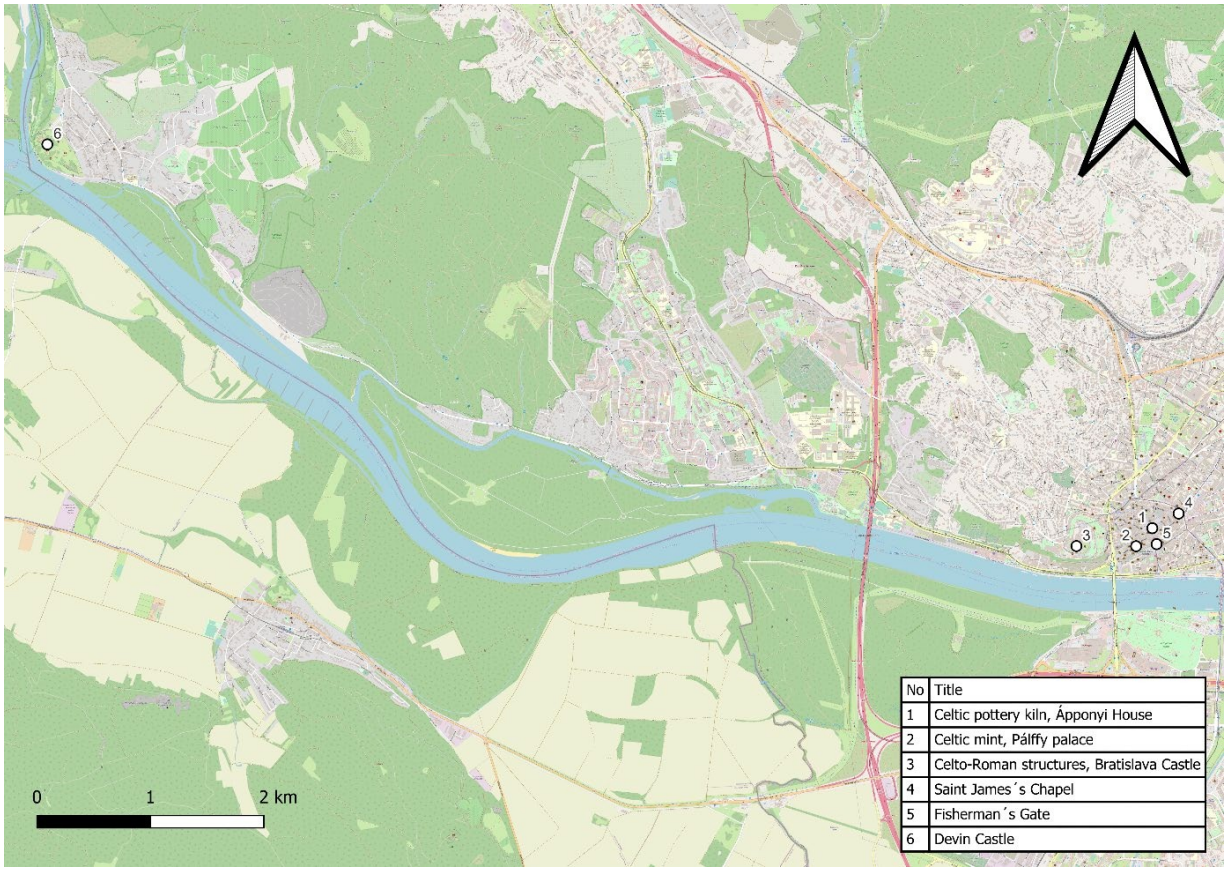

Figure 4-1: The focus sites in Devin City borough and within the Old Town in Bratislava. Source: ICLEI.

Both city boroughs – Stare Mesto and Devín, are of exceptionally high cultural importance and are touristic areas. A large number of monuments of national significance and many archaeological findings are located in the Old Town and Devín. The preservation of monuments is declared as a public interest in the Slovak Republic, which was established 2002 by the Ministry of Culture [3].

For more detailed analyses, specific assets within the medieval town centre (monument preservation reserve) were selected:

- Celtic pottery kiln, Ápponyi House
- Celtic mint, Pálffy palace
- Celto-Roman structures, Bratislava Castle
- Saint James's Chapel
- Fishermen`s Gate, Hviezdoslavovo square
- Devín Castle

Hazards and risks

The Devin City borough and the Old Town of Bratislava are facing risks from a number of different hazards. The Old Town is threatened by pluvial flooding, as the majority of objects are preserved in situ. Moisture and humidity are threats to the cultural heritage sites and assets such as the underground Celtic Kiln. The Devin Castle is situated on a cliff which suffers from erosion and the castle walls are threatened by the movement of the cliff and changing temperatures over a short period of time.

4.2. City baseline

This chapter will highlight the identified gaps of D3.3 as well as new developments and publications of institutional and regulatory frameworks that are relevant for the focus site in Bratislava. These include frameworks for cultural heritage management and for climate change adaptation.

4.2.1. Concept of Sustainable Cultural Development Bratislava 2030

During the writing phase of the D3.3, the framework for development of culture in Bratislava was under development and therefore was not included in the baseline report on Bratislava. However, the concept was finalised this year, in 2022, after a development phase of two years. The public had the chance to comment on the concept within a two-week period and public discussions. In total, over 150 stakeholders were involved and more than 5,000 responses were gathered. All comments raise by the public were incorporated into the concept.

The concept refers to the year 2030 and explains the role of culture in the sustainable development of the city of Bratislava. It serves as a supportive framework for the promotion of culture with its inherent social and civic values. During the implementation phase from this year on, the concept will be regularly updated and evaluated in order to include respond to potential changes.

Overall, the concept recognises the importance of Bratislava´s cultural heritage and the need to take a professional and effective approach to protect its cultural heritage. By 2030 there should also be sufficient funding and staff capacities to manage cultural heritage sites and increase the importance of the cultural heritage site. This is seen as part of a sustainable development for the city. The concept also includes a new sustainable people-centred and environmental sensitive agenda for urban development.

The intersection with other city policies was ensured by linking the concept of sustainable cultural development Bratislava 2030 with the city strategy document Bratislava 2030. Regarding the inclusion of international frameworks, the concept mainly refers to the Sustainable Development Goals, and in particular those related to culture, and is based on five principles: sustainable city, availability and inclusion, environmental responsibility, equality and diversity, and participation and democracy.

Impacts of climate are only one of the threats to cultural heritage sites that are mentioned in the concept. However, they are highly rated, with only the impacts of legislative changes ranked to have a higher notable impact. Hazards to cultural heritage sites such as flooding and heat waves are not directly mentioned, but e.g. shaded areas for visitors of cultural sites are noted as important to ensure a comfortable experience. Furthermore, cultural organisations are advised to consider the impact on the environment when using materials and staging events.

Right now, the complementary action plan is under development, which will consist of tasks, responsibilities, a detailed timetable for implementation, monitoring and evaluation of the presented measures [4].

4.2.2. Sustainable Energy and Climate Action Plan (SECAP) Bratislava

Currently, the City’s existing Sustainable Energy Action Plan (SEAP) is being updated to a

SECAP. This means that this future plan will also incorporate climate adaptation, not only climate mitigation. So far, different topics will be included in the SECAP and various working groups are working on this development. One of these working groups is working on the topic of cultural heritage. However, to what extent this topic will be of explicit attention in the SECAP is not yet clear. In order to preserve the cultural heritage sites in Bratislava, the new SECAP should put more focus on increasing the resilience of these areas in addition to others.

4.3. Overview of Bratislava´s co-creation activities

The following is an overview of the co-creation activities of the city of Bratislava within the ARCH project. The table includes the meetings that were held with the city of Bratislava and other project partners as well as occasionally external partners to co-create the ARCH tools and ensure an effective and successful co-creation process.

In addition to these co-creation activities, the representatives of the city of Bratislava also participated in the regular meetings together with the other three cities as well as the events such as the MLW and General Assemblies. Only the MLW5 is included in the table as these workshops were held in each city separately.

Date	Meeting title	Meeting objective	Involved partners
23.05.2022	Adaptation Pathway internal meeting	• Present, reflect and include feedback in the Adaptation Pathway approach	ICLEI, Tecnalia
21-22.04.2022	MLW5 Strengthening infrastructural and institutional resilience for a resilient city	• Engage with keystone cities • Learn from Bratislava and keystone cities experiences • Explore the tools RAD and RMI	ICLEI, Tecnalia, Fraunhofer, external stakeholder, keystone cities
11.03.2022	Local work plan and matrix meeting	• Discuss local work plan and need for adjustments	ICLEI
23.02.2022	Flexible Adaptation Pathway stakeholder meeting	• Present project and Adaptation Pathway • Ask external stakeholders for their interest and availability	ICLEI, Tecnalia, external stakeholders
23.02.2022	Preparation meeting for Adaptation Pathway	• Plan first Adaptation Pathway meeting with external local stakeholders	ICLEI, Tecnalia

14.02.2022	ARCH DSS co-creation workshop Bratislava, Part 2	• Present ARCH tools HArIS and THIS and DSS structure • Collect feedback from Bratislava on the usability	INGV, ENEA, ICLEI, Tecnalia, external stakeholder
04.02.2022	Bratislava Adaptation Pathway meeting	• Capacities of partners • Engage local stakeholders • Next steps	ICLEI, Tecnalia
20.01.2022	Bratislava Adaptation Pathway presentation	• Organise Adaptation Pathway • Capacities of partners • Engage local stakeholders	ICLEI, Tecnalia
13.01.2022	Check-in meeting	• Set dates and discuss open questions for MLW 5 in Bratislava, Adaptation Pathway workshop and local work plan	ICLEI
26.10.2021	ARCH DSS co-creation workshop Bratislava, Part 1	• Agree on the content of the DRR/CCA assessment • Agree on the input and output layers of the ARCH DSS tool	ENEA, INGV, UNICAM, ICLEI, Tecnalia, Fraunhofer
08.06.2021	Bratislava meeting with WP5 and 6	• Discuss the development of the impact chain	ICLEI, ENEA, INGV, UNIBA
07.06.2021	Bratislava team catch up	• Update each other on the ongoing tasks • Define next steps	UNIBA, MUOP
17.05.2021	Bratislava team catch up	• Talk about ongoing tasks • Define responsibilities and next steps	UNIBA, MUOP
07.05.2021	Bratislava meeting with WP5 and 6	• Discuss the needs for the impact chain • Collect feedback from all partners	MUOP, ENEA, INGV, Tecnalia
26.04.2021	Bratislava meeting with local stakeholders	• Discuss how to involve local stakeholders • Talk about local working group establishment	ICLEI, local stakeholders
16.04.2021	Bratislava meeting with WP5	• Discuss the pluvial flooding model • Define next steps	ENEA, INGV

12.03.2021	Bratislava meeting with local stakeholders	• Present the project • Discuss the needs of local stakeholders	UNIBA, local stakeholders
05.03.2021	Bratislava and MUOP meeting	• Discuss open tasks • Define next steps	MUOP
19.02.2021	Bratislava meeting with WP6	• Discuss suitable climate services • Gather feedback on ideas	ICLEI, UNIBA, Tecnalia, local stakeholder
18.02.2021	Bratislava meeting with WP5	• Discuss which samples should be analysed • Define next steps	ICLEI, UNICAM, MUOP, local stakeholder
15.02.2021	Bratislava team catch up	• Update each other on the local work plan • Define next steps	ICLEI, UNIBA, MUOP
09.02.2021	Bratislava team catch up	• Update each other on the latest developments • Define next steps	ICLEI, UNIBA
09.02.2021	Bratislava local work plan	• Discuss the local work plan • Include adjustments and comments	ICLEI
02.02.2021	Bratislava meeting WP6	• Discuss climate services • Talk about needed data • Define next steps	Tecnalia, UNIBA, MUOP
28.01.2021	Bratislava team catch up	• Update each other on the latest developments • Define next steps	ICLEI, UNIBA
18.01.2021	Bratislava meeting WP6	• Discuss climate services • Talk about needed data • Define next steps	ICLEI, Tecnalia
20.06.2020	Bratislava meeting with WP4 and 5	• Customise ARCH DSS tool for Bratislava • Data gathering and management • Possibility to install sensors to monitor vibration	UNIBA, INGV, UNICAM, ENEA
28.05.2020	Match-making meeting Bratislava, Part 2	• Select test sites and understand how they are related to the city	ICLEI, Fraunhofer, MUOP, UNIBA,

		• Match the needs of the city with the expertise of the partners	Tecnalia, ENEA, INGV
25.05.2020	Match-making meeting Bratislava, Part 1	• Select test sites and understand how they are related to the city • Match the needs of the city with the expertise of the partners	ICLEI, Fraunhofer, MUOP, UNIBA
03.03.2020	Bratislava local event	• Discuss project development • Present project	ICLEI, UNIBA
28.01.2020	Bratislava preliminary resilience assessment	• Discuss hazards • Define the needs for the resilience assessment	ICLEI, Fraunhofer

Table 4-1: Co-creation activities with Bratislava

Table 4-1 gives an overview of some of the co-creation activities within the project. The development and adjustment of the tools were discussed together with the technical partners in bilateral calls as well as during several workshops. Due to staff change in the municipality of Bratislava and therefore the project lead, it was important to have more exchange in the beginning of 2022 to get to know each other better and provide information about the current status and next steps. The involvement of the Bratislava team in the development of the SECAP was also supported by project partners. Therefore, it was possible to include some of the project ideas and findings in it and highlight the relevance of Bratislava´s cultural heritage.

5. Camerino

5.1. Localisation and state of the heritage assets

The Italian municipality of Camerino has a territory of 128 km^2 and a population of 6,312 people in 2020 [5].

Focus site of the municipality of Camerino

The targeted historic area in Camerino is the entire Old Town. It is located at the top of a hill and enclosed by ancient walls. The Old Town has a surface area of 150,000 m^2 and consists of various old residential buildings, churches, monuments of which some have cultural and historical value, e.g. the Ducal Palace and Santa Maria in Via Church.

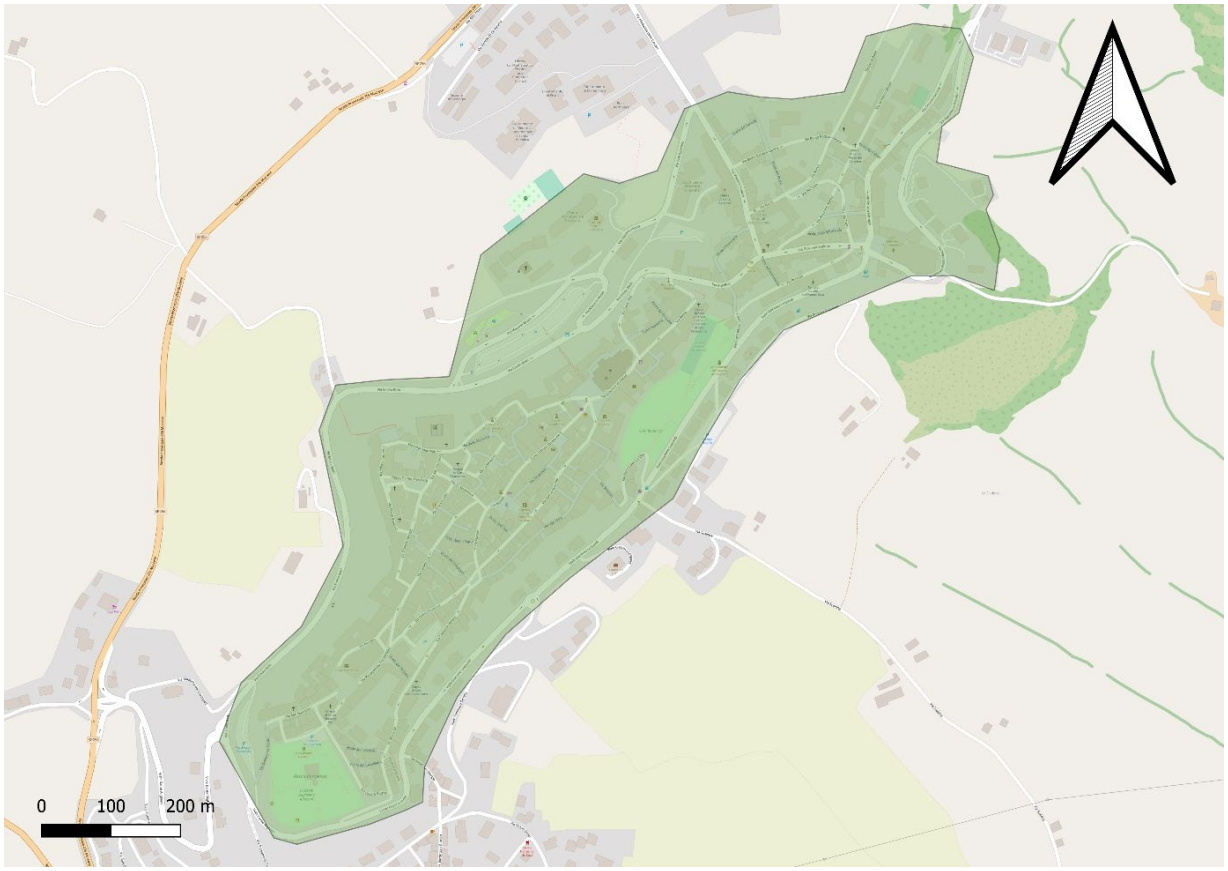

Figure 5-1: The focus site of the Old Town in Camerino. Source: ICLEI.

For detailed studies within the project, two historical and representative buildings were chosen, which are situated in the Old Town of Camerino: the Ducal Palace and Santa Maria in via Church. Both buildings were damaged during the latest seismic sequence in 2016. For more information on these two chosen buildings please have a look at the following document: [1].

Hazards and risks

One of the main hazards Camerino is facing are the seismic events that occur in Central-Italy. After the last major seismic event, the access to the Old Town has been limited. The challenge for the municipality is to not only rebuild what was destroyed but also deal with the social and economic consequences of the seismic event. In order to protect the cultural heritage of Camerino and prevent the municipality from such major impacts of seismic events in the future, more data and information as well as effective decision-making processes are needed, which include multiple stakeholders within the city and beyond.

5.2. City baseline

The following chapter highlights the documents missing from D3.3 for the municipality of Camerino. In terms of development in heritage management, the municipality of Camerino has opened an exhibition on the focus site, approved the extraordinary programme for the reconstruction of the town centre and created additional posts for its management.

No new framework for the maintenance or the protection of the cultural heritage was developed since the publication of the city baseline report, but on June 25 in 2022 an exhibition was launched which aimed to highlight the works of art recovered in the Camerino area and saved from the earthquake, from churches and museums and that were unfit for use. Some of them are going back on display for the public for the first time since that the earthquake in November 2016, others after restoration, and for others it is a question of reviving them through new technologies. This exhibition is one part of bringing the cultural heritage of Camerino back and show its value to visitors and inhabitants [6].

On 30.05.2022, the Extraordinary Reconstruction Programme of the city centre was approved and the worksite construction office as well as the worksite construction commission were established. This commission is necessary as it will provide appropriate indications (on how to be able to obtain the collaboration with technicians from the Territorial Joint Committee, the Special Office for Reconstruction and freelance professionals) to the office. The worksite construction office is composed only of employees of the municipality and is responsible for the management. A total of three possible intervention areas were identified. However, it is recognised that the interventions must be handled flexible so that it can be adapted to the actual situation and the concrete possibility of the opening of worksites. Due to the complexity and ownership structures, a continuous monitoring should be implemented [7].

5.3. Overview of Camerino´s co-creation activities

The following Table 5-1 presents the main co-creation activities of the municipality of Camerino within the ARCH project. The table includes the meetings that were held with the municipality of Camerino and other project partners as well as with external partners to co-create the ARCH tools and to ensure an effective and successful co-creation process.

In addition to the presented co-creation activities in the table below, the representatives of the municipality of Camerino also participated in the regular meetings together with the other three

cities as well as the events such as the MLW and General Assemblies. Only the MLW5 is included in the table as these workshops were hold in each city separately.

Date	Meeting title	Meeting objective	Involved partners
07.-08.04.2022	MLW5 Building a resilience plan in small and medium-sized historic cities	• Engage with keystone cities • Learn from Bratislava and keystone cities experiences • Explore how small and medium-sized cities can prepare • Test the tool RAD	ICLEI, Tecnalia, Fraunhofer, ENEA, INGV, external stakeholder, keystone cities
24.03.2022	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
23.02.2022	Camerino team catch-up	• Plan and discuss the MLW5 in Camerino	ICLEI
15.02.2022	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
18.01.2022	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
23.11.2021	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
12.11.2021	Camerino mutual learning and capacity building campaign	• Present both projects • Discuss how to integrate the results of both projects	ICLEI, Appignano des Tronto (RURITAGE project)
27.10.2021	Camerino DSS co-creation meeting	• Present DSS and possible use of GIS-based systems • Discuss the creation of the DSS	ICLEI, UNICAM, ENEA, INGV
26.10.2021	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI

23.09.2021	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
21.06.2021	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
04.06.2021	Camerino team meeting with WP4 and 5	• Exchange on information systems and tools for DSS • Define next steps	ICLEI, UNICAM, ENEA, local stakeholders
21.05.2021	Camerino team meeting with WP4 and 5	• Present analysis of the climate and other hazards • Discuss needed data acquisition • Define next steps	UNICAM, ENEA, INGV
18.05.2021	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
26.04.2021	Camerino RMI workshop	• Present the RMI • Discuss how the RMI can be useful for the city • Plan next steps on the RMI development	ICLEI, UNICAM, ENEA, Tecnalia, Sogesca, local stakeholders
20.04.2021	Camerino team catch-up	• Update each other on the latest developments • Define next steps	ICLEI
11.03.2021	Camerino team catch-up	• Discuss the impressions of the MLW1 and possible collaboration within the cluster • Provide feedback on survey on the social value of the heritage	ICLEI
09.02.2021	Camerino team catch-up	• Discuss intangible heritage survey for Camerino	ICLEI
28.07.2020	Camerino's research questions	• Refine the research questions for Camerino	ICLEI
21.07.2020	Camerino match making	• Discuss the need/support matrix • Match the needs and priorities defined by the city	ICLEI, Fraunhofer, UNICAM, ENEA, Tecnalia

28.05.2020	Camerino local event	• Present the ARCH project • Discuss possible outcomes	ICLEI, local stakeholders
12.02.2020	Camerino team meeting with WP4 and 5	• Discuss the analysis of the hazards • Update each other on the data acquisition and define next steps	ENEA, UNICAM, INGV
09.12.2019	Camerino visit with WP4 and 7	• Discuss the ongoing activities • Define the next steps • Visit the cultural heritage site	Fraunhofer, ENEA

Table 5-1: Co-creation activities with Camerino

Camerino developed tailored tools together with the other project partners and involved local stakeholders in this process regularly, which enabled the project team to create valuable and practical results for the city.

6. Hamburg

6.1. Localisation and state of the heritage assets

The Free and Hanseatic City of Hamburg is one of four city states in Germany. This means that the city government is organised at the state-level. Hamburg is the second largest city after the capital city Berlin in Germany with a population of 1.853 Mio. in 2021 [8] and with a territory of 755.09 km^2 in 2019 [9].

The City of Hamburg consists of seven districts [10]:

- Altona
- Bergedorf
- Eimsbüttel
- Hamburg-Nord
- Hamburg-Mitte
- Harburg
- Wandsbek

Focus site of Hamburg

The focus site is the UNESCO World Heritage site ‘Speicherstadt and Kontorhaus district with Chilehaus’ is part of the district Hamburg-Mitte and is located close to the City centre in the North and the newly developed HafenCity district in the South. The buildings represent an outstanding example of a combined warehouse-office district within a port city. One of the main characteristics are the canals that are running through the Speicherstadt and the high rate of sealed surfaces.

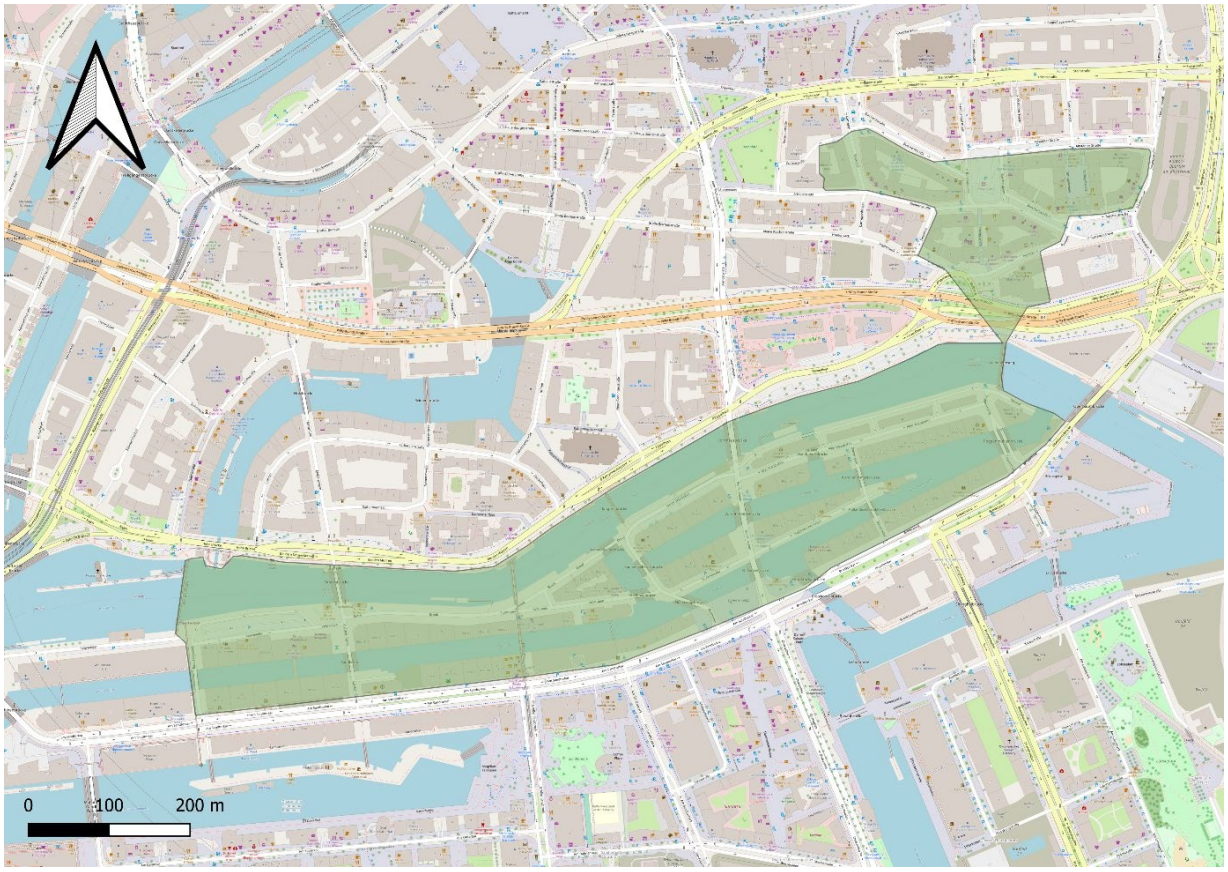

Figure 6-1: The focus sites of the UNESCO World Heritage site in Hamburg. Source: ICLEI.

For detailed analyses of materials for example, specific buildings of the "*Speicherstadt and Kontorhausviertel mit Chilehaus*" were chosen, e.g. warehouse P.

Hazards and risks

The main hazard the focus site in Hamburg is facing is flooding due to sea level rise, rainfalls, storm surges and tidal changes. This is also due to the fact, that the focus site is exposed to canals running through the City in the Southern part.

6.2. City baseline

For the City of Hamburg, no new publications on its governance regarding cultural heritage or climate change were found. The governance structures and documents, which are presented in D3.3 ARCH city baseline report are still up-to-date.

6.3. Overview of Hamburg´s co-creation activities

The following table gives an overview of the meetings and exchanges between the city partner Hamburg and other project partners to co-create tools and work together on the project tasks and discuss internal and external project developments.

Date	Meeting title	Meeting objective	Involved partners
26.-27.04.2022	MLW5 Social and institutional capacities for resilience: form the assessment to the strategy	• Engage with keystone cities • Learn from Hamburg and keystone cities experiences • Explore successful stakeholder engagement and tools RMI and RAD	ICLEI, Tecnalia, Fraunhofer, keystone cities
21.03.2022	Hamburg team meeting with WP4 and 5	• Update each other on the 3D model • Discuss next steps on sensors and the Digital Twin	ICLEI, Fraunhofer, ENEA, UNICAM, RFSAT, ETRI
17.03.2022	Hamburg team catch-up	• Update each other on latest developments • Exchange ideas on exhibition and UNESCO periodic reporting	ICLEI, Fraunhofer
17.02.2022	Hamburg team catch-up	• Update each other on latest developments • Discuss content of the exhibition in the information centre of the UNESCO World Heritage	ICLEI, Fraunhofer
20.01.2022	Hamburg team catch-up	• Update each other on latest developments • Exchange ideas on exhibition and UNESCO periodic reporting	ICLEI, Fraunhofer
14.01.2022	MLW5 preparation meeting	• Exchange ideas for the MLW5 in Hamburg	ICLEI, Fraunhofer, Tecnalia
11.01.2022	Hamburg team meeting with WP4 and 5	• Update each other on latest developments • Exchange ideas on tools development and other tasks • Discuss and delegate next steps	ICLEI, Fraunhofer, ENEA, RFSAT, ETRI
21.12.2021	Hamburg local work plan update	• Discuss if the local work plan needs to be updated and changed	ICLEI
09.12.2021	Hamburg team catch-up	• Update each other on latest developments • Results of the survey about the UNESCO World Heritage site	ICLEI, Fraunhofer

25.11.2021	Hamburg team catch-up	• Update each other on latest developments • Discuss sensors and set date for adjusting local work plan	ICLEI, Fraunhofer
24.11.2021	Hamburg team meeting with WP4 and 5	• Present damage analysis • Discuss next steps for the BIM and Digital Twin	ICLEI, Fraunhofer, ENEA, UNICAM, RFSAT, ETRI
13.10.2021	Hamburg team meeting with WP4 and 5	• Update on territorial scale analysis • Discuss data needed for the BIM and Digital Twin • Present sampling sheet to collect material samples	ICLEI, Fraunhofer, ENEA, UNICAM, INGV, ETRI
23.09.2021	Hamburg team catch-up	• Update each other on latest developments • Present climate service for Hamburg and discuss resilience measures	ICLEI, Fraunhofer, Tecnalia
09.09.2021	Hamburg team meeting with WP4 and 5	• Present results from the analysis with the subsidence-induced damage model • Report status of analysis of materials and plans for sensors	ICLEI, Fraunhofer, RFSAT, UNICAM, INGV
02.09.2021	Hamburg team catch-up	• Update each other on latest developments • Discuss how to implement sensors and survey for the UNESCO management plan	ICLEI, Fraunhofer
17.08.2021	Hamburg team catch-up	• Update each other on latest developments • Discuss how to implement sensors and survey for the UNESCO management plan	ICLEI, Fraunhofer
08.07.2021	Hamburg team catch-up	• Update each other on latest developments • Discuss how to use 3D models and implement sensors	ICLEI, Fraunhofer
08.06.2021	Hamburg team meeting with WP4 and 5	• Discuss the preparation of the UNESCO World Heritage questionnaire	ICLEI, Fraunhofer, ENEA, RFSAT,

		• Decide on the investigations of the heritage site with sensors	UNICAM, INGV, Tecnalia
28.04.2021	Hamburg team meeting with WP4 and 5	• Exchange ideas on 3D models • Discuss the options for the risk analyses	ICLEI, Fraunhofer, ENEA, RFSAT, UNICAM, INGV, Tecnalia

Table 6-1: Co-creation activities with Hamburg

Table 6-1 gives an overview of some of the meetings hold with the city of Hamburg. It was crucial to have regular meetings with technical partners to ensure the needs of the city and also ideas and valuable information of the owner of the focus site were discussed and new developments were taken up. During the project, the Hamburg team decided to create and disseminate an online questionnaire and a physical questionnaire during a local event to the public about the management of the World Heritage Site. This involvement of the public was helpful to integrate their views in the revision process of Hamburg's World Heritage Management Plan. Another focus was on the integration of heritage into Hamburg's digitalization strategy and Building Information Modelling. This ensured that awareness was raising among those involved (local stakeholders).

7. Valencia

7.1. Localisation and state of the heritage assets

The City of Valencia is located at the East coast of Spain. As the main part of the project focus sites are situated outside of the City itself, its specific surface area and population is not as relevant for the understanding of Valencia's project activities.

Focus site of Valencia

For the work on cultural heritage with the City of Valencia, two large cultural and valuable landscapes were selected as the focus areas.

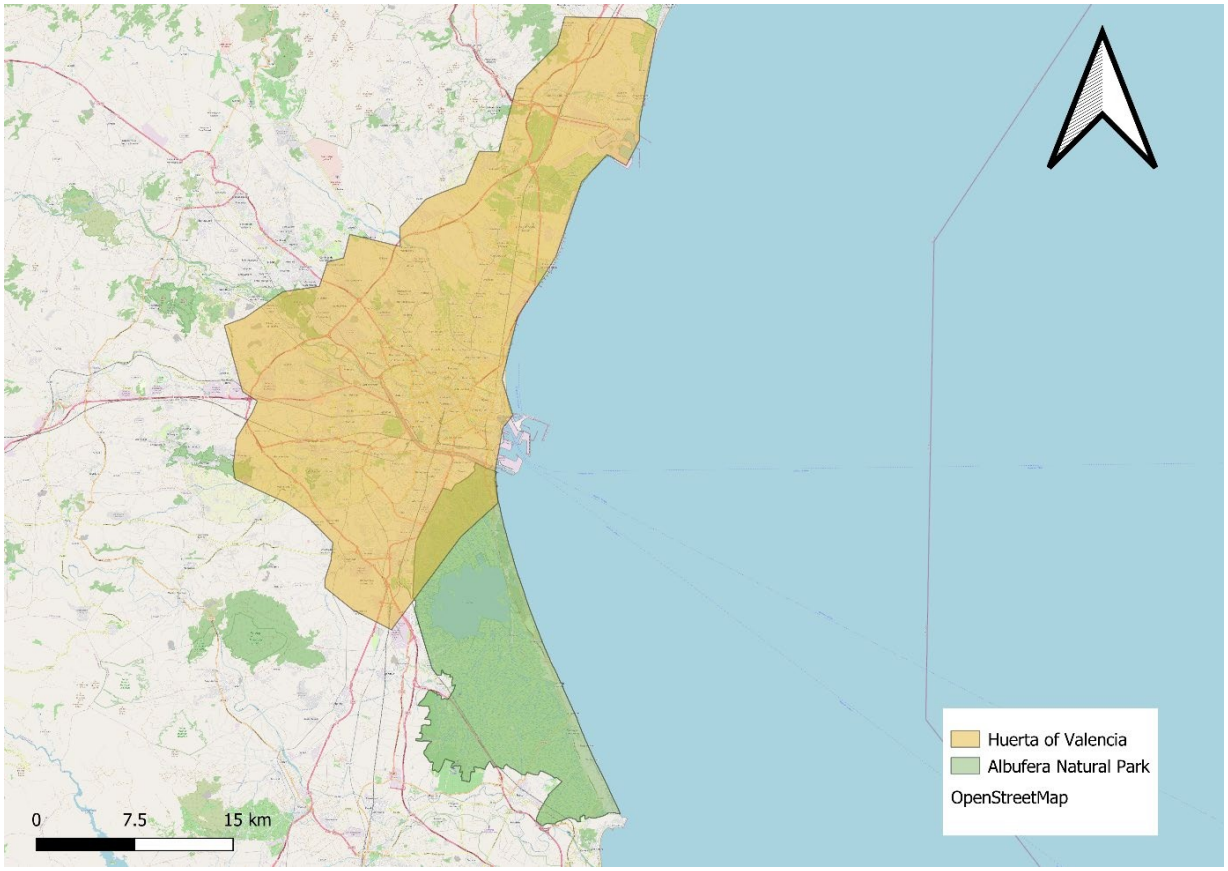

Figure 7-1: The two focus sites of the City of Valencia: the Huerta (here Huerta of Valencia) and the Albufera. Source: ICLEI.

Both landscapes are situated in at least a part of the City of Valencia and do partly overlap as showed in Figure 7-1 above.

Hazards and risks

The main hazards that the Huerta and the Albufera are facing are flooding, storms, wave action in specific areas of the focus sites, extreme temperatures and drought as well as insect infestation.

7.2. City baseline

For the city of Valencia, no new publications on its governance regarding cultural heritage or climate change were found. The governance structures and documents, which are presented in D3.3 ARCH city baseline report, are still up-to-date.

7.3. Overview of Valencia´s co-creation activities

Date	Meeting title	Meeting objective	Involved partners
24.05.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	ICLEI, Tecnalia
09.-10.05.2022	MLW5 Building a resilience strategy for cultural landscapes	• Engage with keystone cities • Learn from Valencia and keystone cities experiences • Explore successful stakeholder engagement and tools RMI and RAD	ICLEI, Tecnalia, Fraunhofer, external stakeholder, keystone cities
28.04.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	ICLEI, Tecnalia
04.04.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	Tecnalia
01.03.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	ICLEI, Tecnalia

15.02.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	Tecnalia
07.02.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	Tecnalia
26.01.2022	Valencia meeting with WP6	• Discuss Adaptation Pathway process • Prepare next Adaptation Pathway meeting	ICLEI
21.12.2021	Valencia meeting with WP6	• Discuss Adaptation Pathway • Gather information on city needs	Tecnalia
12.11.2021	Valencia team catch-up	• Update each other on the latest developments • Define next steps	Tecnalia
28.10.2021	Valencia DSS workshop	• Present and discuss DSS tool • Gather feedback on city needs	ICLEI, ENEA
06.10.2021	Valencia meeting with WP6	• Discuss Adaptation Pathway • Gather information on city needs	Tecnalia
17.09.2021	Valencia team catch-up	• Review thermal modelling • Exchange on needed information and use	Tecnalia
15.09.2021	Valencia team catch-up	• Review thermal modelling • Exchange on needed information and use	Tecnalia
15.07.2021	Valencia team catch-up	• Review thermal modelling • Exchange on needed information and use	ICLEI, Tecnalia
11.06.2021	Valencia meeting with WP4	• Exchange on tool development • Gather information on needed adjustments	INGV
03.05.2021	Valencia team catch-up	• Update each other on the latest developments • Define next steps	ICLEI, ENEA, Tecnalia

25.03.2021	Valencia meeting with WP6	• Coordinate the RMI co-creation workshop • Define roles and tasks	ICLEI, Tecnalia
10.03.2021	Valencia meeting with WP6	• Coordinate the RMI co-creation workshop • Define roles and tasks	ICLEI, Tecnalia
02.03.2021	Valencia meeting with WP5 and 6	• Define useful thermal modelling • Discuss responsibilities	ENEA, Tecnalia
18.02.2021	Valencia meeting with WP6	• Discuss the needs for climate services • Define the possibilities and needed data	ICLEI, Tecnalia
15.02.2021	Valencia meeting with WP6	• Discuss the needs for climate services • Define the possibilities and needed data	ICLEI, Tecnalia
02.02.2021	Valencia meeting with WP5 and 6	• Define useful thermal modelling • Discuss responsibilities	ENEA, Tecnalia
27.01.2021	Valencia meeting with WP6	• Discuss the needs for climate services • Define the possibilities and needed data	ICLEI, Tecnalia
18.11.2020	Valencia team catch-up	• Update each other on the latest developments • Define next steps	ICLEI, Tecnalia
13.11.2020	Valencia meeting with WP5	• Discuss the possibilities of impact chains • Gather information on needed input	ICLEI, Fraunhofer, ENEA, Tecnalia
29.10.2020	Valencia meeting with WP5	• Update each other on the latest activities • Gather needs of the city	ENEA
28.10.2020	Valencia team catch-up	• Update each other on the latest developments • Define next steps	ICLEI, Tecnalia
07.10.2020	Valencia team catch-up	• Update each other on the latest developments • Define next steps	ICLEI, Tecnalia

05.10.2020	Valencia meeting with WP5	• Gather feedback on needs • Discuss which data is needed	ENEA, Tecnalia
18.09.2020	Valencia team catch-up	• Update each other on the latest developments • Define next steps	ICLEI, Tecnalia
09.07.2020	Valencia team catch-up	• Update each other on the latest developments • Define next steps	ICLEI, Tecnalia
11.06.2020	Valencia team catch-up	• Update each other on the latest developments • Discuss and define next steps	ICLEI, Tecnalia
23.04.2020	Valencia team catch-up	• Define tasks and responsibilities • Explore possibilities	ICLEI, Tecnalia
16.04.2020	Valencia meeting with WP7	• Discuss how to approach WP7 • Define what is needed	Fraunhofer
31.03.2020 – 01.04.2020	Valencia match making meeting	• Gather feedback on the city needs • Discuss aims of the city and define next steps	ICLEI
13.01.2020	Valencia preliminary resilience assessment	• Present resilience assessment approach • Discuss steps of the resilience assessment	ICLEI, Fraunhofer

Table 7-1: Co-creation activities with Valencia

Valencia was involved in the development of all the tools and was able to involve local stakeholders in several discussions and events. Also working groups were established during the project, which dealt with different topics and supported the adjustment of the project outcomes to be more relevant and practical.

8. Experiences and lessons learnt – with local stakeholders

Throughout the project, local stakeholders were involved in the activities of the foundation cities and the ARCH project.
Numerous city representatives and researchers from various fields participated in the ARCH co-creation activities.

8.1. Bratislava

8.1.1. Stakeholder mapping

Together with multiple individuals from the Bratislava project team, a stakeholder mapping exercise was conducted. During the selection of the most relevant local stakeholders, they were clustered in four groups: high or low interest and high or low influence. In the following visual, all 17 relevant partners are included. Those partners that were assessed as not interested and not possessing influence were excluded from the table.

MUOP	Old Town City Borough	Devin City Borough	General Investor of Bratislava	Bratislava City Museum	Monuments Board of Slovak Republic
• Public - quaternary	• Public - tertiary	• Public - tertiary	• Public - tertiary	• Public - quaternary	• Public - tertiary
Institute of Archaeology of SAV	Slovak national museum	Central Tourism Information Board	UNESCO Secretariat	Ministry of Culture	Ministry of Environment of Slovak Republic
• Public - quaternary	• Public - quaternary	• Public - tertiary	• Public - tertiary	• Public - tertiary	• Public - tertiary
Slovak Environ-ment Agency	Slovak nature conserve-ancy	Slovak Hydrometeorological Institute	Reg. Association Nature Conservation	Museum of diplomacy	
• Public - tertiary	• Public - tertiary	• Public - tertiary	• Public - tertiary	• Public - tertiary	

Table 8-1: Local stakeholder map of Bratislava

Of the 17 relevant stakeholders, 13 are from the tertiary sector and four from the quaternary sector. All of them are also public entities or organisations that mainly work on cultural or environmental topics.

8.1.2. Local partnerships

The following table gives an overview of the meetings held with local stakeholders in Bratislava. This list does not claim to be exhaustive, but is based on the documents available to the author of this report.

Date	Description	Participants
26.03.2022	Meeting with people from the city working on the SECAP to discuss how to implement ARCH tools and results in the SECAP which was organised by someone not part of the ARCH consortium.	ARCH Bratislava city team, people working in the SECAP of the city
15.04.2021	Second meeting to develop impact chains for precipitation and the impacts on cultural heritage.	ARCH Bratislava city team, local stakeholders except Slovak Hydrometeorological Institute, Monuments Board of Slovak Republic (see Table 8-1)
12.04.2021	Meeting at the Bratislava City Museum building to collect data for 3D modelling.	ARCH Bratislava city team
12.03.2021	First meeting to develop impact chains for precipitation and the impacts on cultural heritage.	ARCH Bratislava city team, local stakeholders (see Table 8-1)

Table 8-2: Meetings with local partners in Bratislava

As the main contact person for Bratislava changed her job and the position remained unfilled for longer than anticipated, the planned activities with local actors were stopped and resumed after more than half a year.

8.2. Camerino

8.2.1. Stakeholder mapping

Together with several individuals from the Camerino project team, a stakeholder mapping was carried out, identifying a total of 18 stakeholders. Based on the stakeholder assessment, all have a high interest in the project, but some have a low impact and some have a high impact on the issues at hand.

Marche Region	Special Office for Reconstruction Marche	Ministry for Cultural Heritage, MIBACT	Superintendency of Heritage of Marche	Archdiocese of Camerino	Diocesan Museum and Picture Gallery
• Public - regional	• Public - regional	• Public - national	• Public - regional	• Public - local	• Public - local
Camerino Civic Museums	Consultation for Develop-ment	Camerino High School	National Civil Protection Department	Regional Civil Protection Department	Con-centrico
• Public - local	• Public - local	• Public - local	• Public - national	• Public - regional	• Private - local
IoNon-Crollo	Group of Surveyors of Camerino	Order of Engineers Macerata Province	Order of Architects Macerata Province	Archeoclub Camerino	GAL Sibilla
• Private - local	• Public - local	• Public - local	• Public - local	• Private - local	• Private - local

Table 8-3: Local stakeholder map of Camerino

Of the 18 relevant actors, 14 are public institutions, the rest are private organisations. Two relevant actors are active at national level, five at regional level and 12 at local level.

8.2.2. Local partnerships

The following table gives an overview of the meetings and workshops held with local stakeholders in Camerino. In several meetings with project partners about the development of the ARCH tools, the Municipality of Camerino was able to involve one or more local stakeholders. This list does not claim to be exhaustive, but is based on the documents available to the author of this report.

Date	Description	Participants
02 February 2022	Meeting about the preliminary results and the information system and tools for the ARCH tool DSS.	ARCH Camerino city team, UNICAM, INGV, ENEA, keystone city Appignano del Tronto and regional and national stakeholders (see Table 8-3)
26 June 2021	Open Day in Camerino to present the ARCH project and visit the case studies	ARCH Camerino city team, UNICAM, local and regional and national stakeholders (see Table8-3)

04 June 2021	Meeting about the ARCH tool DSS	ARCH Camerino city team, UNICAM, ICLEI, INGV, ENEA, SOGESCA, keystone city Appignano del Tronto, and two external organisations (see Table 8-3)
29 April 2021	Meeting about the ARCH tool HArIS and how to implement intangible values of artwork collections	ARCH Camerino city team, INGV, and one local stakeholder (see Table 8-3)
26 April 2021	Workshop on the ARCH tool RMI	ARCH Camerino city team, Tecnalia, UNICAM, ICLEI, ENEA, SOGESCA, and eight external organisations (see Table 8-3)
08 February 2021	Meeting about the ARCH tool HArIS and feedback on its functionality and features	ARCH Camerino city team, UNICAM, INGV and one external stakeholder (see Table 8-3)

Table 8-4: Meetings with local partners in Camerino

8.3. Hamburg

8.3.1. Stakeholder mapping

Of the 19 stakeholders, 2 were excluded as they were evaluated to have no interest and low influence. All the relevant stakeholders are public bodies or mainly owned by the government. Most of them operate at the local/regional level.

ICOMOS national	World Heritage Site Regensburg & Augsburg	University of Hamburg	Agency of Roads, Bridges and Waters	Bezirksamt Hamburg-Mitte	
• Public	• Public	• Public	• Public	• Public	

Table 8-5: Local stakeholder map of Hamburg

Due to the special location of the UNESCO World Heritage Site and the fact that the area is mainly used by businesses and by a public limited company and includes some well-known tourist attractions of Hamburg but no residential areas, mainly public actors play an important role in the management of the site.

8.3.2. Local partnerships

The following table gives an overview of the meetings held with local stakeholders in Hamburg. During the project, the Hamburg city team managed to involve different stakeholders and presented the ARCH project and tried to collaborate with similar projects and research studies and tools that already existed and were used in Hamburg. The following table does not claim to be exhaustive but is based on the documents available to the author of this report.

Date	Description	Participants
07 December 2021	Visit of the warehouse of the Speicherstadt to inspect the site and discuss the results from the analyses done within the ARCH project	ARCH Hamburg city team, Hamburger Harbour Logistics AG
25 November 2021	Meeting to present the results of ARCH tools HArIS and THIS	ARCH Hamburg city team, Hamburger Harbour Logistics AG
21 October 2021	Meeting to present the ARCH project and inform about the survey on the future of the UNESCO World Heritage site and the management plan	ARCH Hamburg city team, 18 local stakeholders as part of the working group
14 September 2021	Meeting to learn more about the BIM	ARCH Hamburg city team, six external local stakeholders
02 July 2021	Meeting to discuss the synergy effects for monitoring	ARCH Hamburg city team, Hamburger Harbour Logistics AG
08 June 2021	Meeting to discuss availability and user rights of the existing BIM model	ARCH Hamburg city team, Hamburger Port Authority

08 June 2021	Meeting to learn more about the BIM and its use for the Heritage Preservation Department	ARCH Hamburg city team, 15 people from the Heritage Preservation Department, the Agency for Geoinformation and the Hamburg Port Authority
26 March 2021	Meeting to discuss how to integrate the Urban Data Hub and the new 3D city-model in the ARCH project tool development and vice versa	ARCH Hamburg city team, five external local stakeholders
17 March 2021	Meeting to get to know each other and discuss the 3D scan and modelling	ARCH Hamburg city team, City of Hamburg BIM Building Engineering
12 March and 26 March 2021	Meeting to get to know each other and present the two projects KERES and ARCH as well as discuss cooperation possibilities	ARCH Hamburg city team, Fraunhofer IBP and EU Office Brussels
09 March 2021	Meeting to collaborate on the national World Heritage Day in June 2021	ARCH Hamburg city team, St. Katherines Parish, Hamburg Heritage Preservation Department
22 February 2021	Meeting to exchange about the visitor tracking and SMART SQUARE project	ARCH Hamburg city team, HafenCity Universtiy

Table 8-6: Meetings with local partners in Hamburg

8.4. Valencia

8.4.1. Stakeholder mapping

Of the 23 stakeholders, one was excluded as the organisation was evaluated to have no interest and no relevance for the project. Most of the relevant stakeholders are public bodies, but also three universities and research centres, seven private companies or associations and four social organisations were identified to be interested or have a high influence on the project. This selection of stakeholders was based on the objective to involve local farmers and active social organisations of the focus sites the Huerta and the Albufera. Most of them operate at the local or regional level.

Consell de l´Horta	Municipality of Valencia – Climate Change	Municipality of Valencia - Agriculture	Municipality of Valencia - Heritage	DG Agriculture	DG Climate Change
• Public	• Public	• Public	• Public	• Public	• Public
DG Territorial & Landscape policy	UPV Cátedra Tierra Ciudadana	UV – Cátedra de l´horta	Valencian Institute of Agricultural Research	Terra I Xufa	Horta viva
• Public	• University	• University	• Research Center	• Private	• Private
Tigernuts producers	Vegetable producers	Fundació Assut	CERAI	Justicia Alimentaria	Per l´Horta
• Private	• Private	• Social	• Social	• Social	• Social
COAG	AVA/ ASAJA	Tourism Department Valencia	Green Urban Data		
• Private – Agrarian trade union	• Private – Agrarian trade union	• Public	• Private		

Table 8-7: Local stakeholder map of Valencia

8.4.2. Local partnerships

Valencia has used the stakeholder engagement process and especially the answers from the first online consultation which included a multi-language questionnaire with their working groups to prioritise the project activities.

In conclusion, the gathering and ongoing involvement of local stakeholders in Valencia was very successful. Due to the regular activities and the structure of multiple working groups with specific topics and connections built among them, the local working groups enabled an effective and valuable prioritisation of the activities and the chances are high that the connections and structures that were built will go on even after the end of the ARCH project.

Date	Description	Participants
25 March 2022	Food and Climate Change Working Group (Local Food Council) 1st meeting	ARCH Valencia city team, Valencia City Council, Facilitation GT Healthy and Sustainable Food

		and Urban Strategy 2030, and six more
25 February 2022	Food and Climate Change Working Group (Local Food Council) 1st meeting preparation	ARCH Valencia city team, Valencia Municipality, Local Food Council Technical Secretariat, CERAI, Local Food Council Technical Secretariat
17 January 2022	Analysis of potential synergies between ARCH and the Valencia Green and Biodiversity Plan	ARCH Valencia city team, Valencia Green and Biodiversity Plan team
27 September 2021	Workshop on the definition of future alternative land use scenarios to be considered during the thermal modelling of the València metropolitan area (by Tecnalia)	ARCH Valencia city team, City of Alba, L'Horta de Valencia Chair, Regional Ministry of Agriculture, Rural Development, Climate Emergency and Ecological Transition, Consortium of the Horta de València Council, Universitat Politècnica de València
30 June 2021	Additional discussions regarding potential synergies between ARCH, the Càtedra L'Horta de València: territori metropolità (University Chair, Universitat de València) and the ESTEPA Research Group (Universitat de València)	ARCH Valencia city team, University of Valencia, Freelance contributor to the Càtedra L'Horta de València
08 June 2021	Analysis of potential synergies between ARCH, the Càtedra L'Horta de València: territori metropolità (University Chair, Universitat de València) and the ESTEPA Research Group (Universitat de València)	ARCH Valencia city team, University of Valencia, Freelance contributor to the Càtedra L'Horta de València
07 April 2021	Analysis of potential synergies between ARCH and the recently launched Interreg Sudoe VALSIPAM project	ARCH Valencia city team, Consortium of the Horta de València Council, Ajuntament de València / Agriculture and Horta Section, Universitat Politècnica de València
23 February 2021	Workshop on prioritisation and adjustment, if applicable, of Agroclimatic and Bioclimatic Indices	ARCH Valencia city team, Universitat Politècnica de València, Visit Valencia, and more
02 February 2021	Kick-off meeting of the coordination tasks among the ARCH and CRISI-ADAPT II	ARCH Valencia city team, Valencia City Council, Foundation

	projects, the Valencia City Council, and the Valencia Local Agriculture Council	for Climate Research, Valencia Local Agriculture Council
08 October 2020	Regional Directorate General on Rural Development Meeting	ARCH Valencia city team, Las Naves, Regional Ministry for Agriculture, Rural Development, Climate Emergency and Ecological Transition

Table 8-8 Meetings with local partners in Valencia

8.5. Summary of engaging with local stakeholders

Overall, the involvement of local stakeholders was of great importance for the success of the ARCH project. Without the expertise of local stakeholders and the involvement of local decision-makers, politicians, city representatives and the local public, the project objectives could not have been achieved. Even though there is still room for involving more local stakeholders in the project activities, the practical feasibility of involving a large number of actors has to be taken into account. The lack of knowledge, interest, capacity and language skills as well as the impact of the Covid 19 pandemic also hindered the involvement of more local partners.

9. Mutual Learning – mainstreaming co-creation

In the ARCH project, in addition to the four foundation cities, three keystone cities per founding city were also involved in various activities, in particular in the six mutual learning workshops. Chapter 10 "*Mutual Learning – mainstreaming* co-creation" describes the framework for working with a total of four city clusters and presents the mutual learning workshops and summarises the results.

9.1. Mutual Learning Framework

European cities outside the ARCH project were invited to participate in the Mutual Learning Framework, a programme for sharing knowledge and disseminating key ARCH findings. Three external cities, so called keystone cities, were clustered with each foundation city based on shared geographical and urban characteristics, shared natural risks and landmarks. For example, Hamburg, Liverpool, Regensburg and Thessaloniki dealt with World Heritage Sites, while Valencia, Alba, Augsburg and Zaragoza focused more on agricultural landscapes. Camerino was joined by Appignano del Tronto, Rhodes and Maribor to discuss the resilience of historic centres in small towns, and archaeological themes guided the discussions in Bratislava, which joined Warsaw, Zadar and Cannes.

The cities shared information with each other at regular intervals throughout the project and during visits in 2019 and 2020. It was in these co-creation spaces, whether workshops for community members or ongoing phone calls between the cities, that some of the project's most important ideas emerged. These collaborative moments ensured that the resources ARCH developed were truly useful for vulnerable communities.

Both the four foundation cities and the keystone cities played an important role in the mutual learning activities of the ARCH project. Each city acted as both mentor and mentee, exploring ARCH tools through gamification and discussing relevant local strategies and initiatives.

Learning from each other, cities have questioned their approached to facing and adapting to natural hazards and their consequences. Mutual Learning participants have come up against the experience of colleagues addressing similar extreme events as theirs, but in different intensity and combination (as different hazard scenarios are possible at various locations in different forms). They have had the opportunity to learn from the consequences of multiple hazards disasters and their cascading effects and discuss strategies to avoid emergency situations.

The following matrix classifies and compares all participating cities according to the hazards.

	Bratislava	Cannes	Warsaw	Zadar
Pluvial flooding				
Drought				
Erosion				
Mass movements / Landslide				

	Camerino	Appignano del Tronto	Maribor	Rhodes
Earthquakes				
Mass movements / Ladslide				
Pluvial flooding				
Air pollution				

	Hamburg	Liverpool	Regensburg	Thessaloniki
Sea level rise				
Drought				
Pluvial flooding				
Heatwaves (in public space)				

	Valencia	Alba	Augsburg	Zaragoza
Wildfires				
Pluvial flooding				
Heatwaves				
Biological attacks				

9.2. Mutual Learning Workshops

The first four mutual learning frameworks were hold online. All foundation and keystone cities took part but were split in groups for specific exercises and activities during these workshops. The clusters working together were chosen based on their shared characteristic.

9.2.1. Mutual Learning Workshop 1

The first mutual learning workshop was held on 9th March 2021. It was the first encounter among the foundation cities, the keystone cities and other ARCH partners. The main objective of this meeting was to get to know each other and exchange the expectations, discover similarities and set goals for the collaboration during the ARCH project. The local government representatives of the keystone cities were introduced to the upcoming tasks and learnt about the ARCH project and its framework.

This kick-off meeting of the series of mutual learning workshops included:

- A brief presentation on the ARCH project, as well as expected outcomes and impacts
- An introduction to the Mutual Learning Framework
- Presentations from Foundation Cities on their target historic areas and their local work plans

- A working session in clusters to identify main areas of shared interest to focus on further work – focusing on common challenges such as climate and other hazards and opportunities for development
- Instructions for keystone cities on how to develop their analysis

Among the already mentioned sections, icebreaking activities were included to produce a comfortable environment for exchange and make the meeting more enjoyable for the participants. Also, the next steps and main conclusions were part of the first mutual learning workshop.

The exercises with the four clusters were moderated by the project partners and online whiteboards were used to note ideas and exchange knowledge as well as explore similarities and opportunities to work together. The results of the cluster exercises can be found in the Annex 6.1.

9.2.2. Mutual Learning Workshop 2

The second mutual learning workshop was held online on 12th May 2021 for half a day. The workshop included both, plenary discussions with all participants and breakout sessions where the participants were slip into the four different clusters with one foundation and its keystone cities.

The objectives of the workshop were to introduce the ARCH disaster risk framework and the role of data collection in improving resilience, inform the participants about standardisation activities for a resilient development and explore the data elaboration and visualisation trough the HArIS tool, which is a databased of geo-referenced information on historic areas.

The workshop included two warm-up exercises, presentations on the ARCH framework for disaster risk management and standards for building resilience in cities. After a section of active listening with presentations from key cities, participants responded to the presentations and wrote down their impressions and ideas on an online whiteboard. The next section consisted of the presentation of the HArIS and two different questions on how the HArIS could be applied at the local level.

9.2.3. Mutual Learning Workshop 3

On 7th of October 2021, the third mutual learning workshop took place online.
During the workshop, the participants explored and discussed about the use of the RAD tool.

The objectives of the workshop were to present the RAD tool and let the participants explore the tools functions and provide feedback on it. Another objective was to exchange experiences and ideas on local policy-making for the improvement of resilience in historic areas and follow up on the previous mutual learning workshops.

The objectives were achieved through, among other things, two warm-up exercises, a presentation of the ARCH RAD tool and a subsequent question and answer session. Four different breakout groups, each with the four city clusters, explored a specific RAD Essential on a particular topic. The exercise was conducted using an online whiteboard where the RAD Essential was discussed. The four groups then reflected on the RAD and discussed the theme of the previously analysed RAD Essential with a focus on their local policies and strategies and

their relevance to the resilience of historic areas. The last section included the presentation of the next steps.

Cities discussed their approach in monitoring and reporting on the resilience of historic areas, including UNESCO reporting when relevant. They considered how the ARCH RAD tool could be integrated in their local work and administration processes.

9.2.4. Mutual Learning Workshop 4

ON 9th December 2021, the firth workshop was held to discuss and reflect on the development of the DSS tool.

The objectives of the workshop were to define elements that characterize impact scenarios and explore their importance to enhance local resilience, to exchange ideas and experiences on social and economic vulnerabilities and indicators.

After an introduction and a warm-up exercise, the impact scenarios and vulnerability indicators were presented. The DSS tool was presented and experiences from the different city clusters were collected and discussed with each other using online whiteboards prepared before the workshop. The workshop concluded with next steps and rough planning for mutual learning workshop 5.

Participants reflected on the prioritization of actions in order to increase local resilience, considering multiple hazards scenarios. In particular, they performed a collaborative exercise on Miro, using a prioritization matrix to highlight needs and opportunities of climate action.

9.2.5. Mutual Learning Workshop 5

The firth mutual learning workshops took place as separate face-to-face events in all four foundation cities each on two days.

The workshops objectives and exercises were tailored to the cluster city's needs and each workshop had a different topic.

The workshop in Bratislava focused on infrastructural and institutional resilience, the one in Camerino on the creation of a resilience plan in small and medium-sized historic areas, the workshop in Hamburg on social and institutional resilience capacities and the workshop in Valencia on the creation of a resilience strategy for cultural landscapes.

9.2.6. Mutual Learning Workshop 6 – Stakeholder Dialogue

The sixth mutual learning workshop, also called Stakeholder Dialogue, was held in the keystone city of Thessaloniki on June 1st and 2nd. The meeting shared ARCH´s practical tools and resources with the keystone cities and eight external cities. This was a great opportunity to share the outcome of the project and reflect with all participants on the co-creation activities and experiences within the project.

To reflect on the origins of this co-creation work, the process began with the project partners defining what co-creation really meant for the project. The partners defined a shared vision as well as principles and a practical framework for the collaboration. All this became part of the ARCH guideline of the co-creation approach (see chapter 2 "*Reflections on the guideline on*

co-creation approach"), which describes the way forward as democratically driven creation and co-development of knowledge and solutions by project partners and their stakeholders based on trust, accountability, credibility, inclusiveness, transparency and flexible communication.

9.3. Mutual learning conclusions

Overall, the mutual learning workshops and stakeholder dialogue became a direct exchange of knowledge and know-how between the cities. They also served to gather feedback from people with different backgrounds and perspectives and to see if the tools developed would be useful in other contexts and in other European cities. The cities had the opportunity to exchange ideas on the work to develop, identifying similarities and opportunities of collaboration. In addition, the participants emphasised that they inspired each other and can draw motivation for their daily work from the exchange with others working on similar issues and topics.

Particularly, with regards to the development of tools, technical partners received feedback from all Mutual Learning cities that enabled the refinement of their platform. Being tested from different cities around Europe and not involved in the project activities, the ARCH tools enhanced their flexibility in order to be applicable to different contexts and needs. More specifically:

- The ARCH RAD was used by all cities as a tool for reporting on their historic area resilience maturity level. The identification of weak resilience areas through RAD was a first step for Mutual Learning cities to identify priorities of action within and beyond the ARCH project.
- The ARCH RMI was easily applicable to all contexts suffering from the identified hazards (i.e. biological hazard, Coastal flooding, Drought & Water scarcity, Earthquakes, Extreme heat & Heatwave, Fluvial flooding, Landslides, Pluvial flooding, Soil Erosion). The general definition of measures included in this tool, in fact, does not vary depending on the urban characters of the cities, but rather on their needs and climatic conditions. If on the one side this makes the measures quite generic, on the other they proved to be very useful to initiate a local discussion on how to apply such strategies to the local context.
- The ARCH HArIS and THIS, as well as the ARCH DSS are, on a different note, highly dependent from local data and urban characters. Their replication in different cities is nonetheless a possibility that the Mutual Learning framework confirmed once again. The city of Maribor has, for example, decided to transfer their historic area dataset into the HArIS/THIS, recognising the high value of data visualisation for decision making. This process has continued beyond the formal project finalisation.

As explained in the previous paragraphs, the ARCH tools have a high potential to be largely used and applied to different contexts and even integrated in other local reporting and evaluation processes. More specifically, a recent collaboration between ICLEI and the Organisation of World Heritage Cities (OWHC) has tested the ARCH RAD and RMI on a group of over 10 European cities that were not involved in the ARCH project. The results suggest that these tools could be integrated into UNESCO reporting processes. ARCH partners commit to mainstream and sounding out the potential of tools beyond the project.

10. Obstacles and enablers to co-creation

The following chapter is not structured based on the four foundation cities but more general results and conclusions from the experiences made during the project.

10.1. Obstacles

This chapter 10.1 presents the different obstacles encountered for co-creation during the ARCH project. These obstacles include both, internal as well as external processes, developments and backgrounds. Most of the obstacles presented were overcome during the project and their solution was translated into an enabler for successful co-creation. Therefore, some of the obstacles mentioned are linked to the solution mentioned in the chapter on co-creation enablers.

10.1.1. Lack of time for discussions and questions

One of the most frequent feedbacks from participants on the co-creation activities was the insufficient time for deeper discussions on certain topics and for answering questions. Therefore, the upcoming co-creation activities were planned with more time for discussions in plenary, but also in the breakout groups and more time for answering open questions. Even though the time for the co-creation activities was adjusted, in some cases the discussions were still going on after the given time frame. This was mainly due to the complexity of the discussion topics and the fact that participants shared their experiences in different settings and from different backgrounds. These exchanges were very fruitful, but the responsible project partner had to lead the discussions and could only provide a limited time frame for such discussions.

10.1.2. Language barriers

The participation of local stakeholders is sometimes associated with obstacles, as language barriers have to be overcome. In some cases, it was possible to pay for simultaneous translation during an event, but this was not implemented as the vast majority of participants were sufficiently able to communicate in English. However, this should be taken into account and the project budget should also allow for on-site or online translations. In addition, event organisers need more time to solicit quotes from and involve translation services.

10.1.3. Understanding of the topic and tasks

The ARCH project partners developed a variety of tools and conducted analyses using different methods. In order to create useful and effective tools, it was one of the main aims to co-create them together with the city partners. This is and was only possible if the partners involved understand to a certain extent the scientific terms and create a common definition ofkey words and concepts.
As the partners have a scientific background in different fields, e.g. cultural heritage, in climate adaptation, in modelling or other, it is necessary to gather knowledge on specific topics that one is not familiar with. This task of understanding the work of the involved scientific partners and translating it for the involved city partners was one of the major tasks of ICLEI within the ARCH project.

10.1.4. Understanding of each other

Working with a team from different backgrounds in their field of study and using different working styles, it is key to get to know each other better during the time of the project. When you understand the background and working style of each other you can create a working environment that is more tailored to the specific needs of each partner. To identify, understand and solve potential conflicts, avoid misunderstandings and
It is much easier to build trust with each other if you meet or see each other regularly. Therefore, regular (monthly) meetings between the urban and technical partners were introduced. After a review of the meetings with the consortium partners, both meetings were combined and held jointly with the urban and technical partners under the guidance of ICLEI.

10.1.5. Covid-19 pandemic

During the project period, the Covid 19 pandemic broke out and changed the way the project partners worked together. Already planned face-to-face events, e.g. with local actors, had to be cancelled by the municipal partners, which also affected the internal cooperation of the partners.
The two main impacts of the pandemic were the shift from face-to-face meetings and events to online events and the uncertainty of the situation, especially in countries where partners had to stay at home due to a lockdown.
The possibility of being interrupted or distracted during an online meeting is much greater than during a face-to-face meeting. As the number of meetings increased (also in view of other projects), time management became more difficult for some of the consortium partners to juggle all the meetings and a certain fatigue towards online meetings and events set in after some time.
Without face-to-face meetings and events, it was challenging to set up local working groups and collaborate with local stakeholders. Some partners or stakeholders involved lacked sufficient technical equipment to work (efficiently) from home and some had to take care of children or relatives who could not go to social institutions such as kindergartens, schools or care homes.
Due to the Covid 19 restrictions, meetings were hold online. This increased the number of possible meetings and workshops and also made it easier to participate as no travel expenses and travel time was needed to join meetings. Overall, this has led to the participation of more people.

10.1.6. Low interest of local stakeholders on the topics

For most of the foundation cities involved, it was initially difficult to generate interest among local, regional and national stakeholders in the issue of protecting cultural heritage in the face of climate change. This was also the case because the combination of cultural heritage and climate change adaptation is relatively new and has only generated greater interest among decision makers, researchers and the public in recent years.

10.1.7. Limited capacities of local stakeholders

During the project, local actors were involved by the municipal partners, in some cases with the support of ICLEI. Even if the local actors were interested in participating in the ARCH project activities and becoming part of the local working group, this meant that these tasks were in addition to their regular daily work tasks, which made it even more difficult to convince them to take time for these activities. However, one of the main solutions to engage them was

to highlight the benefits to their daily work and also talk directly to them about how to make their participation as efficient as possible, for example, by adjusting the date and time of the activities, focusing on the most important topics, and preparing clear and user-friendly information and tasks. Another strategy to get relevant stakeholders to participate was to integrate ARCH activities into their local context and work. In Bratislava, for example, the development of SECAP is still ongoing, and stakeholders involved were made aware of the ARCH project and the benefits of its inclusion in their work. This joint collaboration with existing or yet-to-be-developed policies was one way to make ARCH more relevant to local stakeholders.
In some cases, however, these adaptations and attempts at persuasion were not enough, and key stakeholders with very limited time were not able to participate in any or all of the relevant activities.

10.1.8. Knowledge of local stakeholders on the topics

As noted by the partners involved, some of the local stakeholders lacked specific knowledge about cultural heritage management or climate change adaptation. This was also one of the barriers to engaging these stakeholders, as some of them are unaware of the potential benefits if they were to participate. However, most of the identified and involved local stakeholders have a great knowledge on the topics of cultural heritage and other specific fields they are working on and were chosen because of their expertise, knowledge, and influence on the selected site.

10.2. Enablers and recommendations

Based on the explanations of the co-creation activities and the experiences within the ARCH project, enablers and recommendations are drawn on how to involve consortium partners and cities in the project as well as local stakeholders in order to co-create tools and work successfully together. This overview is clustered in four different categories: before, during and after co-creation activities as well as more general recommendations on co-creation activities.

10.2.1. Before conducting co-creation activities

Use of different co-creation formats

There are of course various ways on how to conduct co-creation activities. Therefore, it should first made clear who is responsible to organise the activities. Second, one should decide with also gathering feedback from the potential participants if the activity should be held as a face-to-face, online or hybrid event. Most of the project activities and exchanges among project partners were held online due to the pandemic and as face-to-face and hybrid events need more time and resources to be organised and implemented. However, face-to-face events especially at the beginning of the project and in the end as well as regular ones every few months helped to get to know each other better, motivate each other and stay connected.

Set clear roles for everyone actively involved

During the ARCH co-creation activities, it was ensured that the roles for conducting, leading and recording the activity were clearly defined beforehand. The most important roles were those of speaker or facilitator, moderator and minute taker, which were divided among the responsible persons.

Check whether a translation is required
As several co-creation activities involved local stakeholders, the responsible project partner coordinated with the urban partners and other project partners when translation was needed during the activity. In most cases, the urban partners were kind enough to translate the content into their local language and took on parallel tasks such as facilitation or (simultaneous) translation. Other project partners were also able to help out as they are native speakers or have sufficient language skills in the required local language. In some cases, the project budget could also have been used for (simultaneous) translation. This should be considered well in advance of the event to have enough time to find a suitable translator if needed.

Safe environment, especially during the Covid 19 pandemic
Prior to the implementation of the ARCH activities, the responsible project partner ensured a safe environment with the lowest possible health risks. During the Covid 19 pandemic, activities were mainly conducted online. During the face-to-face events, national and local regulations were followed and additional testing (free materials were distributed) and safety measures were implemented. This was very important to create an environment where all participants felt comfortable and safe.

Involve all relevant partners and stakeholders
Before setting the date, planning the agenda and sending out the invitation to the activity, the responsible project partner ensured, if possible through consultation with other project partners, that all relevant partners and stakeholders were included as possible participants. In this way, the ARCH co-creation activities included different views and ensured that the tolling and other outcomes were known to and discussed with all relevant people and organisations.

Plan for non-participation of participants / representatives of organisations and cities
With the Covid 19 pandemic, the risk of project partners or other invited persons spontaneously declining their participation in the ARCH co-creation activity increased immensely. Especially in face-to-face meetings, it became clear that the responsible project partner had to plan ahead and ensure that participant cancellations would occur, e.g. due to illness or flight cancellations. By having other people available and sharing materials and input before the activity, it was possible to include them or their colleagues anyway.

Inform participants ahead
To give participants the opportunity to plan the upcoming activity and make a note of the date, it is important to inform everyone a few weeks before the activity starts. The time frame in which it is best to send out the information depends very much on the activity and whether participants need to prepare in advance (see next section). However, if the date (and time) of the activity is fixed, it should be communicated immediately. This was almost always achieved during the project and project partners informed each other about upcoming activities during various regular meetings, such as the general meetings and joint update calls with all project partners involved, but also during the catch-up meetings in the cities when only one city partner was present.

Preparation tasks for participants
In order to include the views and experiences of all or at least some of the participants, they were informed about the tasks before the ARCH co-creation activities. The preparation of inputs by the participants is not always necessary and should also be meaningful and manageable for them. The most common input was a presentation of the status quo and next steps. However, input was also collected via online whiteboards and online surveys. In some

co-creation activities, participants had the opportunity to contribute even if they could not participate in the activity themselves.

10.2.2. During co-creation activities

Include ice breaking activities and introductions
In order to work together more openly and efficiently, it is important to build trust and get to know each other. To create a safe and comfortable environment for the participants, rounds of introductions as well as various "icebreaker" activities were included in the joint work. Even if it seems trivial, the participants felt more connected and also opened up more during the following exercises when they also shared more personal information with each other.

Moderate and take notes of the activities
The co-creation activities were facilitated to guide the participants through the different exercises and sessions. It was also very important to keep track of time, as some discussions were very complex and stimulating but dragged on for too long. Another task of the facilitator was to ensure that bilateral discussions that did not concern the majority of the participants were monitored and moderated so that they were stopped and continued at a later time only with those they concerned. Moderation was almost always able to achieve this goal.

Use creative and new software and formats to co-create
Even though this means more work and effort for the organisers and participants, especially in the beginning, it was very useful during the ARCH project to use previously unknown software and formats for the co-creation work. On the one hand, due to the pandemic, it was necessary to adapt to more online activities, but on the other hand, it became clear that a variety of different software and formats keeps participants interested and is effective for different objectives when carrying out co-creation activities. Working with a survey can help to collect ideas, observe commonalities or get answers on how participants feel and how they want to proceed. An online whiteboard was used during the project to incorporate written exercises and collect information from all participants in an effective way as tasks could be done in parallel. Overall, it is true that getting to know and using new software and formats can take more time, but if chosen correctly, collaboration becomes much easier, more effective and fun.

Explore the city sites – local visits
During the mutual learning workshops number 5, which were held as face-to-face meetings on site, it became clear that the connection to the city and its risks and challenges becomes much more present and realistic when one has seen the places on site. This is not only beneficial to the consortium partners, but also for the engagement of the so-called keystone cities as well as other interested stakeholders, e.g. researchers and politicians.

Plan enough time for discussions and questions
One of the main critical feedbacks on the co-creation activities was the insufficient time for deeper discussions on certain topics and for answering questions. The responsible project partner had to ensure that the sessions were not too long and the discussions not too broad, but that there was also enough time for fruitful and goal-oriented discussions.

Note and store all relevant information
Note-taking or writing down of contributions by participants during co-creation activities captured all relevant information. In most cases, only the main discussion points and

conclusions were noted, which was more efficient for the co-writer or active participants and those who read the shared notes later. The use of the structured templates for the notes in advance sped up the creation of the notes and made them easier to understand for the reader.

10.2.3. After co-creation activities

Collect feedback on the co-creation activity
In order to get more information from the participants about the co-creation activities and make them as useful and effective as possible, it is important to follow up and get feedback from the participants. This was mainly done with the help of online questionnaires and conversations with the participants after the activity.

Learn from feedback on the co-creation activity
The feedback collected from the participants of the co-creation activities was analysed and incorporated into the planning and organisation of future co-creation activities. This ensured that the missing points and the needs of the participants were heard and that the co-creation activities were as effective as possible for the participants and the ARCH project.

Share results with participants and invited people
The main outcomes of the co-creation activities were shared either afterwards with the participants or also with those who could not attend the event, e.g. due to illness or other reasons. The written results were also uploaded to the project's web-based workspace, which all project partners had access to during the ARCH project.

10.2.4. General tips on co-creation activities

Establish regular meetings
As has been shown in the work on the ARCH project, when working with several partners on different tasks within a project, regular meetings are useful to keep track of the work done by the other partners and to create time and space to talk about next steps and possible challenges. However, during the life of the project, regular meetings may not be able to be kept and need to be managed more flexibly. This should not happen frequently and regularity should be resumed when partners have more capacity again. Several regular meetings have been established within the ARCH project, e.g. the General Assembly meetings, Joint Update (formerly City Update and Technical Partner) meetings, WP4 and 5 meetings, Hamburg City Meetings, etc.

Covid-19 pandemic and flexible working
All of the lessons learnt from Covid 19 pandemic are applicable to other actors, as they are universal and people all over the world have had to deal with constraints such as lockdowns and change the way they work together. However, there were differences among the Foundation's four cities in the timing and extent of pandemic-related restrictions. This also meant that some partners were able to plan and hold face-to-face meetings and events later than others, e.g. in Italy, and therefore Camerino, the full lockdown began in March 2020 and lasted for three months.
In order to deal with the Covid 19 restrictions, flexible working should be enabled by providing technical equipment (hardware and software) and teach people how to use digital devices applications. Over the time of the project, online meetings and events became more normal

and all partners were able to properly use the online tools that were needed to work together, e.g. online polls, whiteboards, etc.
Online tools should be used not only to effectively work on project tasks but also to exchange on a personal level and include some rather playful moments or parts to create a positive atmosphere.
Nevertheless, it became clear that face-to-face meetings are needed in some cases to build or rebuilt trust and connect on a more personal level. It is also easier to express feelings and thoughts when meeting in person.

Recognise change of staff working on the project
Some of the key staff of the partners left the project for various reasons during the project period. This led to some inconsistencies and slowed down the project activities. However, this is a normal process and should be recognised as a potential risk from the beginning. To better deal with this situation, relevant information should be stored and organised in a coherent way. This was done in the ARCH project with the help of the online project management tool Confluence. New staff members were able to read through the documents and collect the necessary information. In addition, the project partners made sure that new staff members were welcomed and kept up to date by team members on ongoing tasks.
Although all partners tried to integrate the new staff as much as possible, it is always the case that staff changes lead to a certain delay and experience and trust in the cooperation have to be rebuilt.

Be flexible and involve additional project partners
As new requirements and ideas for possible research emerged during the project, other project partners were involved, e.g. the Electronics and Telecommunications Research Institute from South Korea. This of course depends on the framework conditions of the project, but in the case of the ARCH project it was very useful and meaningful to involve other competences and organisations and thus achieve even more results.

Use a workspace to share information
A web-based workspace was used and was accessible to all project partners. On the workspace, the information about the activities, notes and pictures as well as different overviews of meetings and events were shared between the project partners. This tool was very effective and helped among other things to share the results of the co-creation activities and to inform each other about upcoming events. Documents such as agendas and presentations were also shared via the workspace.

10.3. Outcomes and impacts

The ARCH project and the co-creation activities within the project had various outcomes and impacts. Some of them are presented in this chapter. However, some of the impacts of the project and its co-creation activities may not have occurred yet and can only be observed in the future when some time has passed. By then, participants will probably have reflected on, internalised and applied them extensively and shared and disseminated the project experiences and outcomes, such as the ARCH tools.

Creating of new jobs or security of jobs
By involving four foundation cities in the ARCH project, they were able to create new jobs (in the case of Hamburg and Valencia) and maintain existing jobs (in the case of Bratislava and Camerino). However, these results are only temporary, as they only provide employment

opportunities or security for a certain period of time, namely during the project.

Raising awareness among city staff
The involvement of city partners and their colleagues in the project has led to fruitful discussions within the city administration and has raised awareness for the topics of cultural heritage and climate change. This inspiration was valuable to broaden the perspective and be more aware of the current and future threats as well as the own preparedness when it comes to climate change and the conservation of cultural heritage. The full impact of these discussions can only be guessed and might lead to more integrated thinking and more resilient developments in the cities.

Expand knowledge among project partners
Through the joint development of different tools and ideas, the project partners have gained knowledge about technologies such as new software, sensors, modelling, risks and much more, and have learned about different application areas, practical (implementation) obstacles and collaboration.

Creating a co-creation framework for replication
ARCH has tested a co-creation approach, mainstreamed in the different activities of the project (as described in the previous chapters), that proved to add value for the development of flexible tools as well as in local decision making. The approach, based on the co-creation principles[1], can easily be replicated in further projects and activities beyond ARCH.

Developing tools for European historic areas
The co-design of the ARCH tools which included several feedback sessions from project partners, local stakeholders and external cities (i.e. the keystone cities) aimed at creating platforms that could be used by all European cities with a historic area. In particular, the ARCH RAD and RMI are ready to be exploited by public administrators and decision-makers around the continent. They can be integrated in existing processes, such as evaluation, reporting and co-creation. Regarding the ARCH DSS, HArIS and THIS, they allow interested cities to include local data prior coordination with developers. The already available information on site enables a quick replication of the model and identification of data needed.

[1] Refer to chapter 2.

11. Conclusion

The co-creation activities of the ARCH project ensured that the tools developed were relevant, understandable and user-friendly for the urban partners and beyond. By adapting the co-creation activities more flexibly to the needs of the participants, taking into account the project objectives, the ARCH project facilitated fruitful and effective discussions and exchanges between the project partners and other stakeholders involved. This rather iterative and flexible approach, which only works when feedback is collected and improvements are made to the processes and formats, was the basis for successful co-creation in the project. One of the main obstacles to co-creation during the project was the Covid 19 pandemic, which prevented face-to-face meetings for a long time and required project partners to adapt rather quickly, e.g. working remotely and using rather unknown online tools and software for collaboration.

The co-creation activities were very useful to generate valuable results that reflect the needs of the city partners and beyond also gather feedback from other cities and stakeholders on different aspects of the ARCH project. By exchanging ideas and experiences, the participants of the co-creation activities inspired each other's thinking and work and were able to motivate each other.

By constantly collecting feedback during the various meetings and workshops to monitor the participants' appreciation or feelings, it was possible to improve cooperation and react to possible problems at an early stage.

Despite the obstacles mentioned in previous chapters, many stakeholders beyond the project partners were involved and useful tools were developed by the project partners, which would not have been possible without the input of the city partners and other local and external stakeholders.

12. Resilience Assessments of historic areas using the ARCH RAD

During the first year of the ARCH project, all teams of the pilot cities conducted baseline resilience assessments using the preliminary version of the UNDRR Disaster Resilience Scorecard for Cities [11] guided by the Fraunhofer team and in collaboration with local research partners:

- For Bratislava, the assessment was conducted as a webinar between the municipality of Bratislava, MÚOP, and Fraunhofer on January 28, 2020.
- For Camerino, the assessment was conducted within a workshop in Camerino between the municipality of Camerino, the University of Camerino, ENEA, and Fraunhofer on December 9, 2019.
- For Hamburg, the assessment was conducted as a webinar between Hamburg, ICLEI, and Fraunhofer on February 11, 2020.
- For Valencia, the assessment was conducted as a webinar between Las Naves, Tecnalia, and Fraunhofer on January 13, 2020.

The results of these assessments are documented in D3.3 "*ARCH city baseline report*" [1] and provided first insights of the overall resilience of the cities and the historic areas examined by ARCH. However, since the UNDRR Scorecard targets the city-level, not all questions were applicable on the level of historic areas, which resulted in the city teams providing some answers on city level instead of historic area level.

The application of the UNDRR Scorecard made several drawbacks and potential improvements visible, which informed the development of the ARCH Resilience Assessment Dashboard (RAD), an online resilience assessment tool for historic areas (see D3.6 [12], D7.3 [13] and D7.6 [14] for more details). The RAD is specifically aimed at historic areas and can be used to collaboratively work on resilience assessments with several users. The RAD and its underlying questionnaire was developed in a co-creative process, spanning three years, culminating in the independent application of the RAD by the city teams to perform resilience assessment during April 2022. As the RAD questionnaire covers more topics than the original Scorecard and subsequently is significantly more extensive[1], a full assessment could not be conducted within the runtime of the project. Instead, each city team started the long-term process of a detailed resilience assessment by choosing between two and three resilience topics (called Essentials) of the questionnaire and assessing the resilience within these topical areas without consulting further local stakeholders. An overview of the different assessments as well as the examined historic areas is provided below:

- **Bratislava:** E01, E07; Monument Preservation Area and Devin Castle

[1] 128 questions for a 'quick' resilience assessment with the RAD and 221 questions for a 'detailed' assessment with the RAD compared to 47 questions for a 'quick' assessment with the UNDRR Scorecard and 117 questions for a 'detailed' assessment with the Scorecard.

- **Camerino:** E02, E09, E10; Camerino Old Town
- **Hamburg:** E04, E08; World Heritage Site Speicherstadt and Kontaurhausviertel
- **Valencia:** E01, E05; Huerta de Valencia and Albufera de Valencia

During the 6th General Assembly Meeting in Rome in early May 2022, the city teams presented and discussed their assessment results, which are presented in summary in the following sections. It is important to note that these results only showcase the experience of the ARCH project team over the duration of the project; the results should not be employed to develop resilience action plans, as not all necessary stakeholders have been involved in the assessment process.

In addition, a direct comparison of the RAD results with the assessment results provided in the baseline reports is for most parts not possible, since the questionnaires differ too much from each other. Even though the RAD questionnaire is based on the UNDRR Scorecard, the actual questions and the foci of the Essentials are too different from each other. Due to the specific focus of the RAD on historic areas and historic assets, additional content and sources were built into the Essentials, compared to the topics covered by the UNDRR Scorecard. This also resulted in a new structure of the Essentials offering a different amount and focus of subessentials (the subcategories of each Essential). Moreover, a comparison of results between pilot cities is neither desired nor possible. On the one hand, this is because questions are always answered from a subjective perspective and are therefore dependent on the person doing the assessment. On the other hand, the questionnaire can be tailored to the specific situation in the historic area, which can reduce the maximum achievable score.[2] Despite these reasons, the assessments provide insights and indications of the resilience levels of the sites.

12.1. Bratislava

The Bratislava team chose to conduct a resilience assessment focusing on Essential 01 and Essential 07. An **overall resilience score of 73/205 (36%)** was achieved. The overall score as well as the scores for Essential 01 and 07 are shown in Figure 2.

For **Essential 01 "Organise for resilience", a score of 46/125 (37%)** was achieved. Up to date there is no existing (long-term) strategy or action plan to increase or maintain the resilience of the historic areas in Bratislava that includes steps for climate change adaptation, heritage management and social justice. However, steps to prepare a new Sustainable Energy and Climate Action Plan (SECAP) are being taken and relevant stakeholders are being involved in these processes. The historic areas have responsible persons for coordinating resilience. However, they also have other responsibilities. Regarding additional expertise and relevant knowledge for resilience building, a dedicated climate change expert that can consult with the resilience team is available, however the team lacks expertise in the fields of social justice, disaster risk management and heritage management. Resilience is only rarely used as

[2] Users can indicate that certain questions "do not apply", which results in the maximum score of the related (sub)essential being reduced by the number of points that could be gained by this question.

a decision-making criterion, but there is a full-on track record of actions taken to increase resilience not only for the historic areas but for the whole city.

For **Essential 07 "Strengthen Social Capacity for Resilience" a score of 27/89 (34%)** was achieved. There exist some NGOs and/or community groups that are involved in the resilience building processes but overall, there is room to improve the collaboration and engagement of these. In the event of a disaster, all inhabitants are likely to be contacted during or immediately after the event. However, there is no confidence that regular contact will occur in the longer period following an event, and there is also a lack of explicit involvement of vulnerable population groups. The scores show that social capacity to build resilience is particularly lacking in terms of private sector and resident engagement. There are plans but no action yet to involve the private sector in resilience building activities, and efforts of employers to educate their employees on resilience issues apply only to some employers and could be extended to a broader spectrum within the private sector. An important way to increase social resilience, evident from the results, is to regularly and frequently involve residents in the resilience building process, which also uses the values of the historic area as a means of formulating messages.

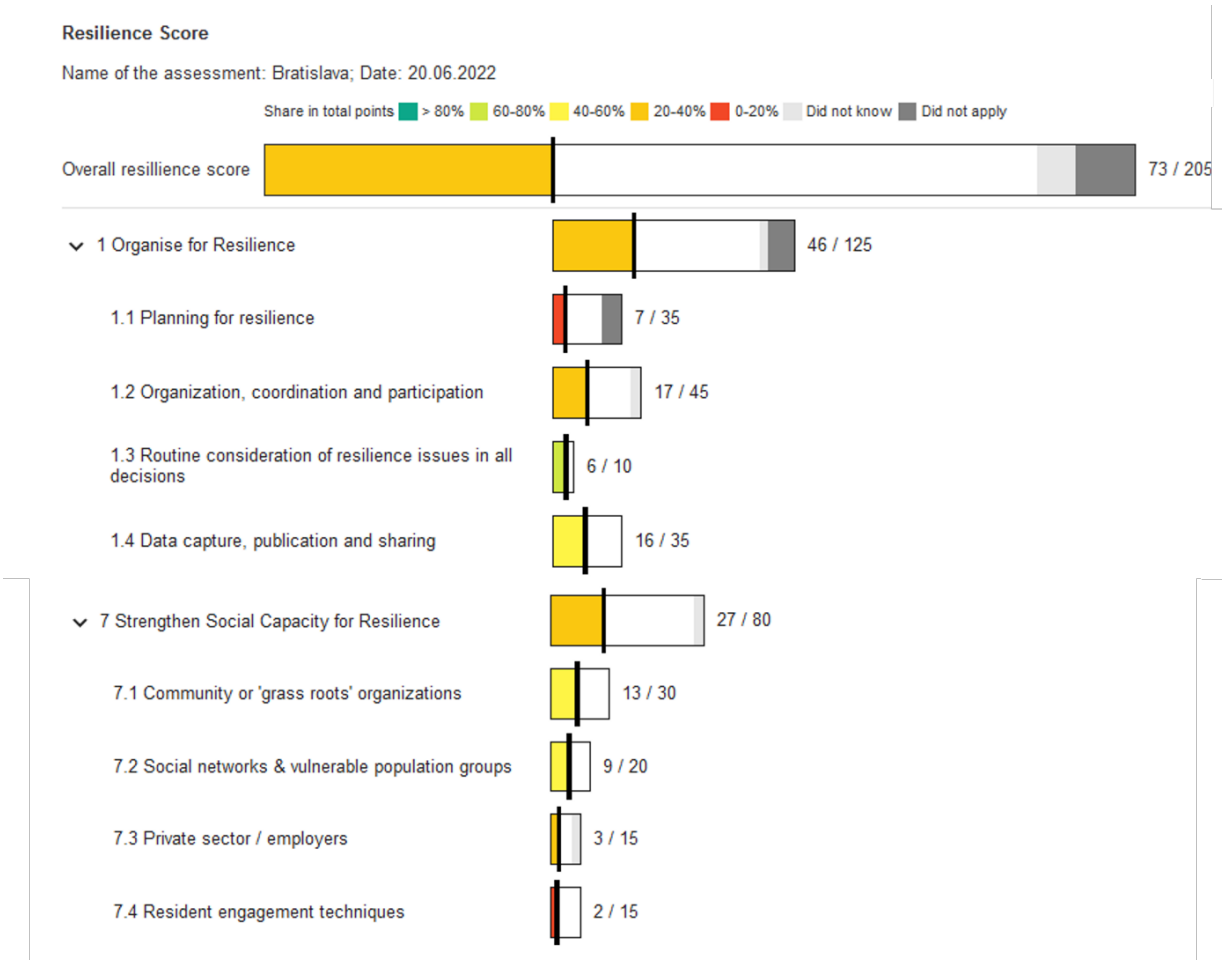

Figure 2 Resilience score overview for Bratislava

12.2. Camerino

The Camerino team conducted resilience assessments for Essential 02, Essential 09 and Essential 10. Camerino received an **overall resilience score of 127/320 (40%)**. The overall score as well as the scores for each Essentials are shown in Figure 3.

For **Essential 02 "Identify, Understand and Use Current and Future Risk Scenarios", a score of 32/120 (27%)** was achieved. A risk analysis has only been conducted in a rudimentary way and is not subject to a regular updating process. However, the main hazards for Camerino, which include seismic and geomorphological hazards, are comprehensively known, regularly updated, and analysed in terms of "worst case" and "average case" scenarios. However, climate change-related hazards and the corresponding scenarios are not sufficiently considered in the analysis of hazards. Only for extreme precipitation some basic instructions are given, while for other extreme events reliable current scenarios are missing. Although the risk analysis is rudimentary, its assumptions and methods are consistent with those at city and/or regional level, e.g., with the civil protection plan. What is clearly missing in terms of risk analysis is knowledge about the exposed elements to hazards as well as the vulnerability factors affecting the historic area. While there is some knowledge about past impacts and consequences, there is room for improvement in risk analysis when assessing future impacts, e.g., on the natural environment, economy, culture and social life.

For **Essential 09 "Ensure Effective Disaster Response", a score of 52/105 (50%)** was achieved. Warning systems are seen as reliable and specific, while there are concerns about reaching all vulnerable population groups, especially older citizens. Gaps are seen in existing event response plans, particularly in their level of detail, while the integration of these plans with some intersecting plans and capabilities is seen to be in place. Camerino is well equipped in terms of the needs of first responders and other staff, as well as the ability of historic area staff to assist first responders. Emergency equipment needs, apart from some gaps in specific professions or geographic areas, are defined but not sufficiently reviewed. Another important way to improve disaster response is to provide shelters for disaster-affected persons and depots for movable heritage. Disaster drills for the resilience team and first responders are conducted regularly, although only a small group of the population (e.g., students) has been included in such drills. No disaster drills have been conducted recently due to the COVID-19 pandemic.

For **Essential 10 "Expedite Recovery and Build Back Better", a score of 43/95 (45%)** was achieved. A pre-disaster recovery plan did not exist until the last seismic sequence in 2016 after which a post-disaster recovery plan has been developed in which most relevant stakeholders have been involved. Recovery is seen holistically as a process that includes preparedness, response, mitigation and sustainability, but there are gaps in practical implementation. While intangible heritage is not considered in the post-disaster recovery plan, tangible heritage is partially considered – the main omissions concern the use of damage scenarios of the architectural heritage and the assessment of possible suitable sites for the recovery of artwork collections. There is a Post-Disaster Need Assessment (PDNA) which fully considers heritage issues, although climate change issues and some social issues are not considered. Camerino shows good performance in building back better, e.g., because information on traditional knowledge is partly analysed and to be included into the building back processes. In addition, local citizen associations, inhabitants and local stakeholders were

involved in the rebuilding efforts by seeking their feedback to update the reconstruction plan of the Old Town. Lastly, the Camerino team stated that access to funding, skills, materials, and equipment will be in sufficient supply after a disaster, although probably with some delays.

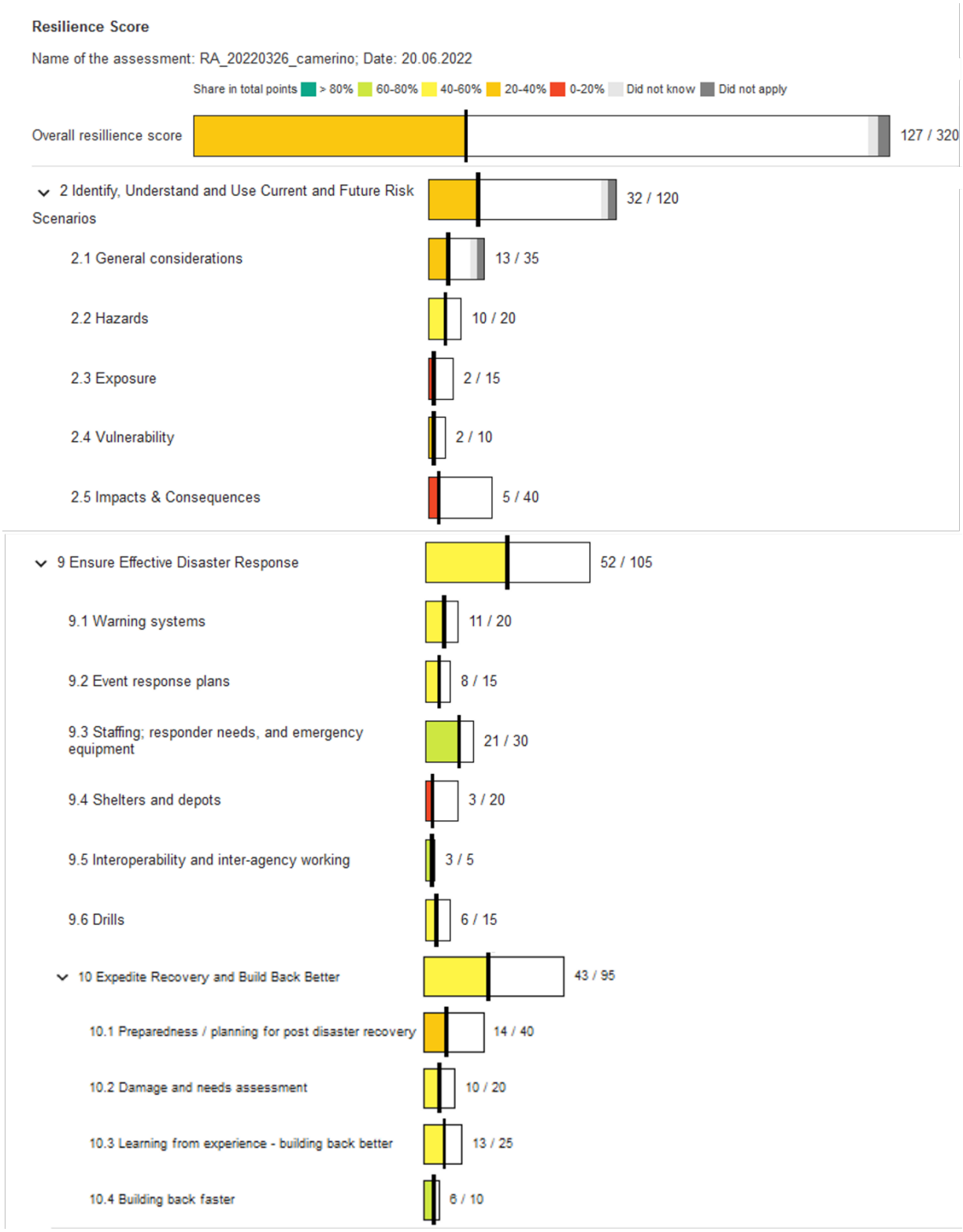

Figure 3: Resilience score overview for Camerino

12.3. Hamburg

The Hamburg team conducted resilience assessments for Essential 04 and Essential 08. They achieved an **overall resilience score of 131/305 (43%)**. The overall score as well as the scores for the two Essentials are displayed in Figure 4.

For **Essential 04 "Pursue Resilient Development", a score of 69/160 (43%)** was achieved. Cultural heritage features in the historic area are fairly assessed, with a focus on tangible heritage features rather than intangible heritage and natural features. Tangible heritage features are systematically identified, assessed for condition, and regularly maintained. Potential factors that could affect the historic area are partially taken into account – disaster preparedness is very well considered, while other factors such as the impacts of climate change tourist use are only considered to a limited extent. Although the local community is only involved to a certain extent in development planning through participatory planning tools, which leaves room for improvement, well-organised informal planning structures have been created that effectively complement the formal planning structures. One issue with the formal planning structures and legal instruments is the lack of implementation of resilience considerations in practice. However, on the positive side in terms of resilience, the planning and implementation of development measures is done in consultation with at least some stakeholders and with the inclusion of cultural heritage values.

For **Essential 08 "Increase Resilience of Supporting Infrastructure and Service", a score of 62/145 (43%)** was achieved. Protective structural measures against climate-related hazards and human-made hazards are well in place and are regularly and effectively maintained. However, traditional knowledge is not considered when designing these measures. Regarding the loss of supply in the event of a disaster, it is estimated that the loss of water and energy supply and the communication network would mostly be moderate in the "worst case" scenario. Backup systems for water or energy supply are not known or do not exist. In contrast to these systems, Hamburg's transportation system is well equipped against disasters. Road, rail/metro, and waterway networks as well as other means of transportation fail only moderately, minorly or insignificantly in a "worst case" scenario. Moreover, emergency healthcare capabilities fully cover the needs in both the "average case" and "worst case" disasters. Finally, there was no evidence on the costs of restoring all services (water, energy including electricity and gas, transportation, and communication), which contributes to a low resilience (score).

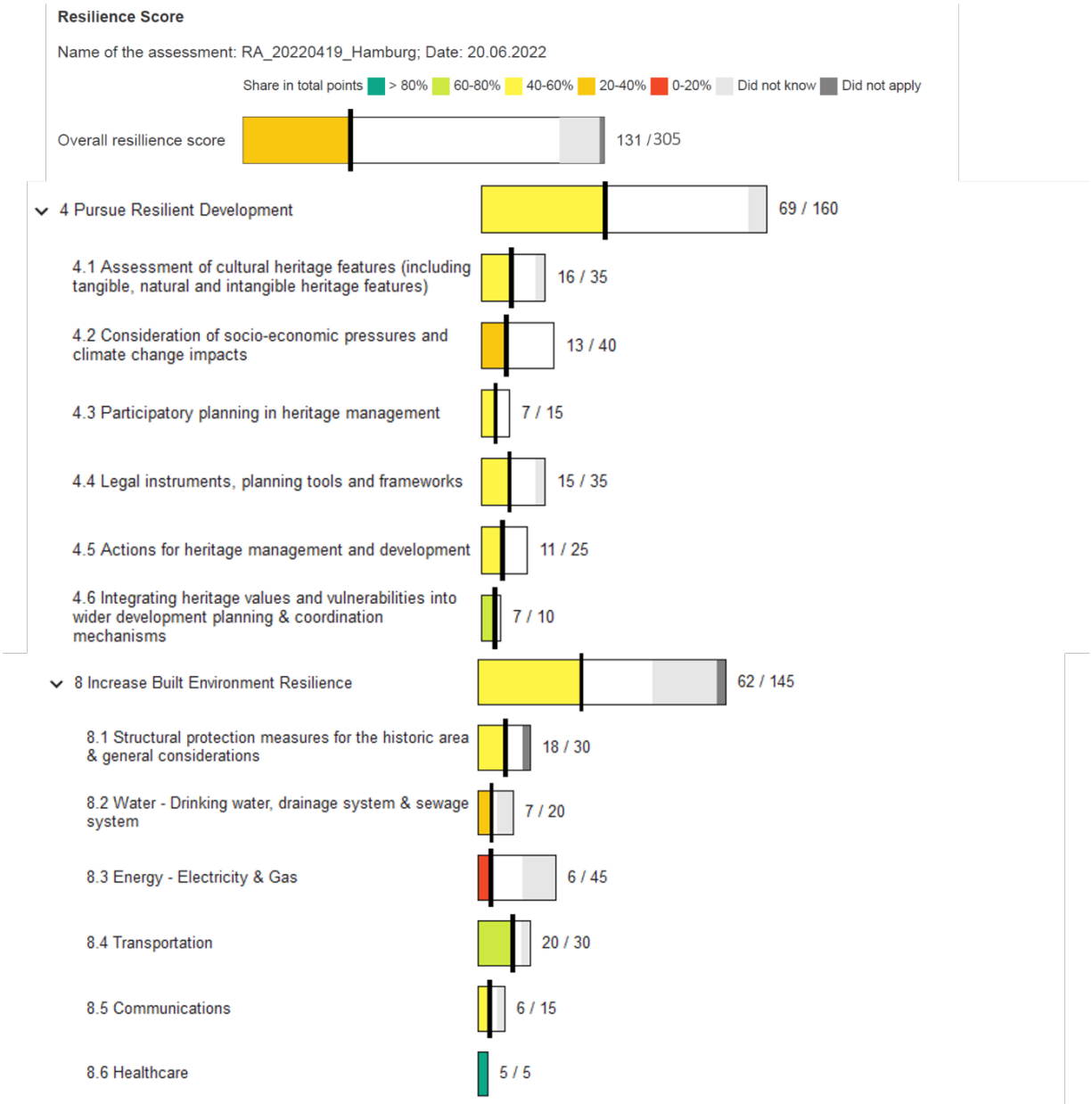

Figure 4: Resilience score overview for Hamburg

12.4. Valencia

The Valencia team conducted resilience assessments for Essentials 01 and 05. They achieved an **overall resilience score of 60/165 (36%)**. The overall score as well as the scores for the two Essentials are displayed in Figure 5.

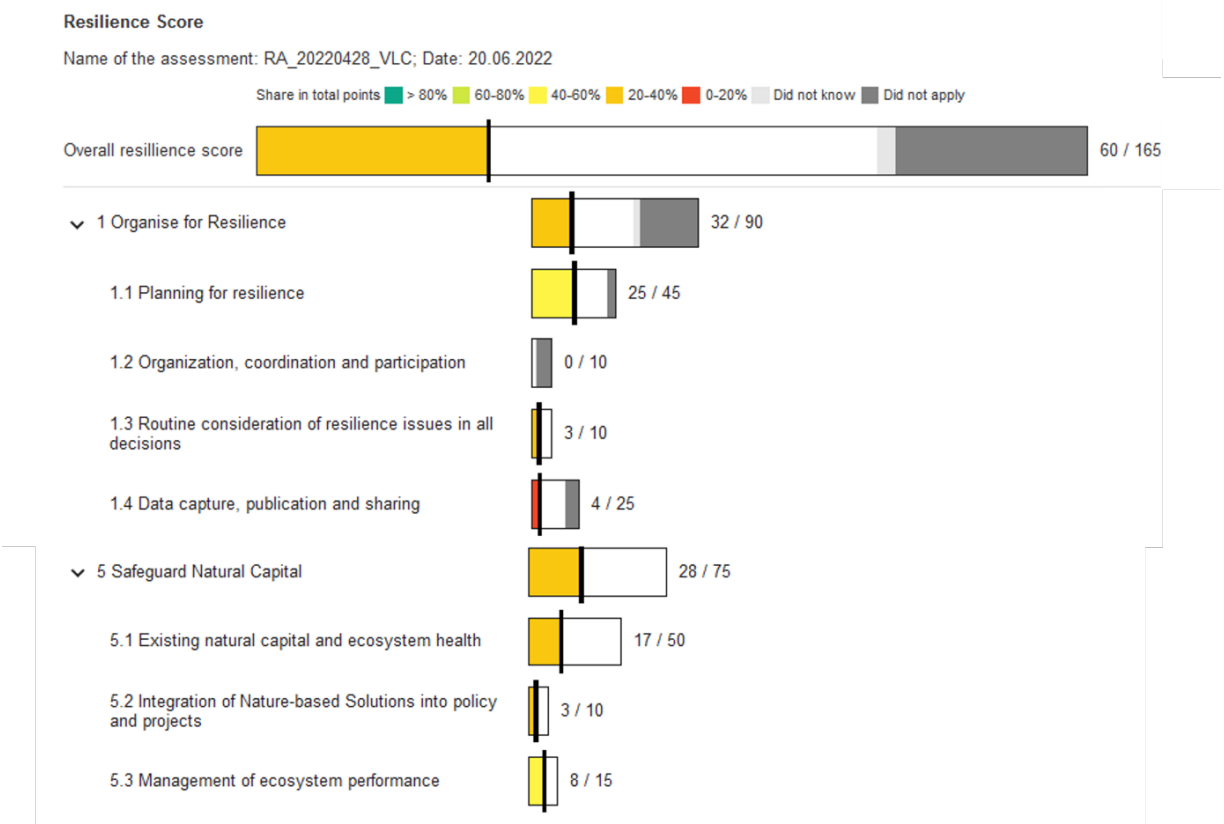

Figure 5: Resilience score overview for Valencia

For **Essential 01 "Organise for resilience", a score of 32/90 (36%)** was achieved. While there exists a long-term resilience strategy or action plan it is considered largely inadequate. The main reason for that is that a comprehensive, specific plan is not available, and there are just some brief references to resilience within the Action Plan for the Dynamic Conservation of the "Historical Irrigation System at l'Horta de València, Spain" Globally Important Agricultural Heritage System [15]. This is also reflected in the fact that the mentioned action plan has not been reviewed yet and that there is no established process for monitoring the resilience building process, although there is commitment to undertake such a review and establish a monitoring process. In addition to missing review and monitoring processes, there is also no established resilience team for the historic areas. Subsequently, there is also only a very limited track record of resilience improvements over the last years. On an organisational level, most elements of the social-ecological systems that constitute the historic areas are considered in resilience planning, which also considers heritage management issues to a large extend. In addition, a sufficient number of stakeholder groups are consulted in resilience planning. However, issues of climate change mitigation / adaptation, disaster risk management, and social justice are only considered to a limited extend in resilience planning, the consulted stakeholder groups are only regularly involved in resilience planning for a limited

number of topics, and data on the resilience of the historic areas is not shared with other organisations or the local communities.

For **Essential 05 “Safeguard Natural Capital”, a score of 28/75 (37%)** was achieved. While some dependencies of the historic areas on natural capital and ecosystem services within their administrative borders have been identified, no dependencies on natural capital and ecosystem services that are outside the historic areas have been identified. In addition, these dependencies have not been quantified. On the contrary, most impact drivers of the historic areas on natural capital and ecosystem services have been identified, although these have also not been quantified. Nonetheless, some measures for safeguarding natural capital and ecosystem services have been implemented and additional measures are planned. Regarding the use of nature-based solutions to increase resilience, some measures have been implemented, but these are only monitored in an ad hoc fashion. This is consistent with the fact that there is no strategy or action plan in place to make more use of nature-based solutions for resilience building. Considering the management of ecosystem performance there are transboundary agreement in place with some organisations that enable ecosystem-based approaches including ecosystems outside the administrative boundaries of the historic areas, and sustainable and equitable access of local communities to the ecosystem services within the historic areas is largely ensured. However, these is no person or team appointed to supervise and monitor ecosystem performance.

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Annexes

Mutual Learning Workshop 1 whiteboard results

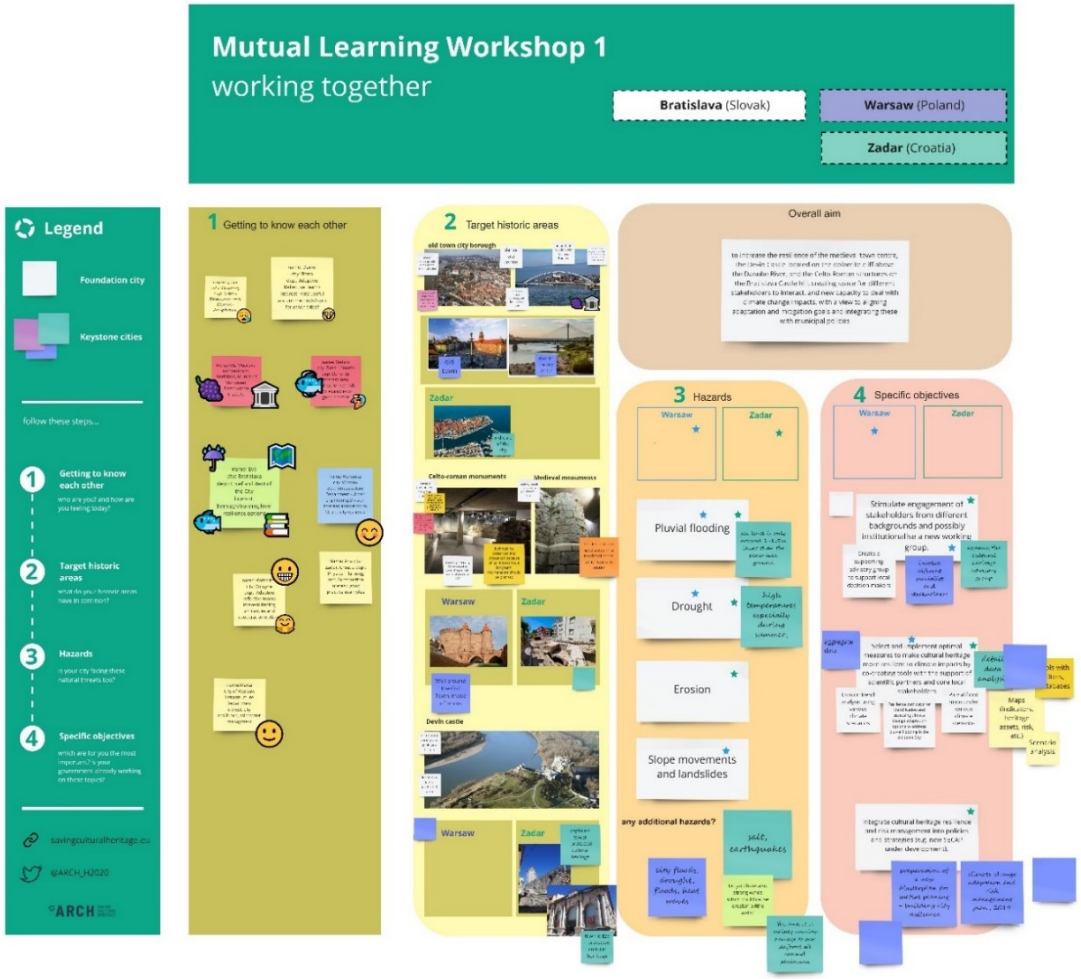

Figure 13-1 Bratislava cluster exercise

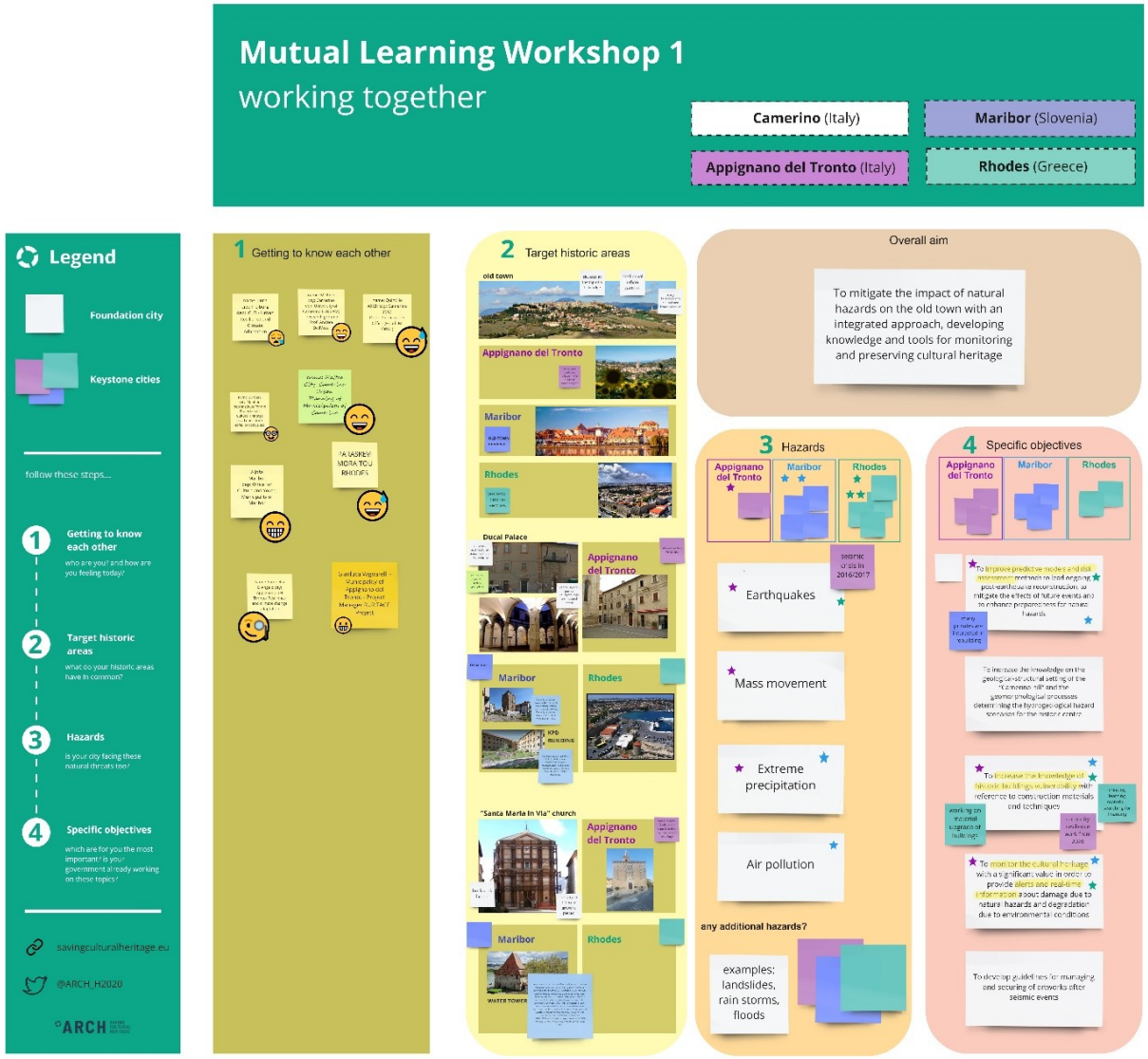

Figure 13-2 Camerino cluster exercise

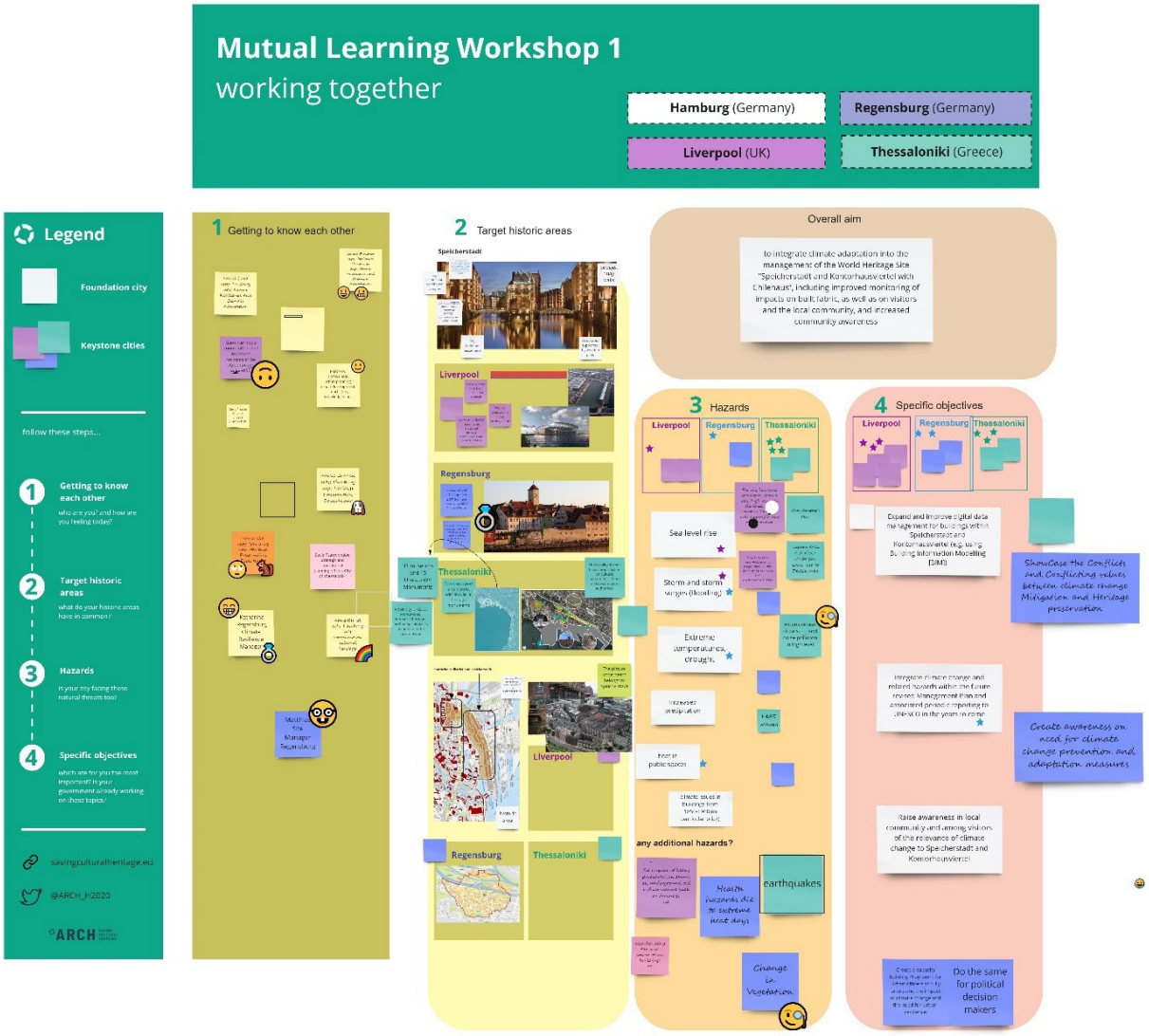

Figure 13-3 Hamburg cluster exercise

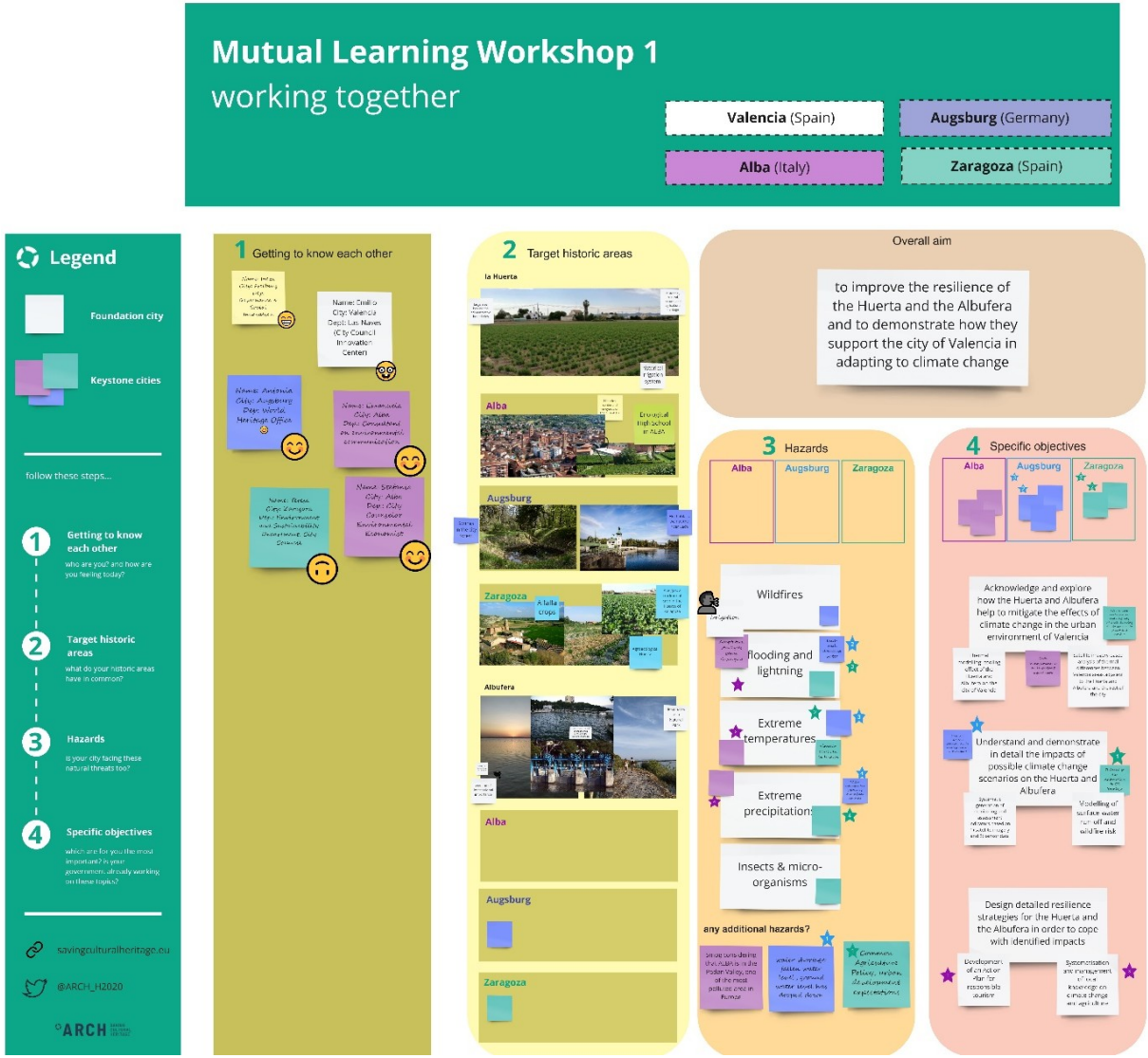

Figure 13-4 Valencia cluster exercise