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# ARCH D3.3 City baseline report - Camerino

17 December 2021



| Deliverable No.             | D3.3   |
|-----------------------------|--|
| Work Package                | WP3  |
| Dissemination Level         | PU   |
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| Due date                    | 2020-03-31   |
| Actual submission date      | 2021-12-17   |
| Status                      | For submission   |
| Revision                    | 3.0 (2021-12-17)   |
| Reviewed by (if applicable) | Eleanor Chapman, Iryna Novak (ICLEI), Saskia Maresch<br>(DIN), Vittorio Rosato, Ludovica Giordano (ENEA)                           |

This document has been prepared in the framework of the European project ARCH – Advancing Resilience of Historic Areas against Climate-related and other Hazards. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 820999.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 820999.

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## 1. City profile

The municipality of Camerino (Figure 1) has a total surface area of 128km<sup>2</sup> with the Old Town accounting for 0.15km<sup>2</sup>. The municipality is located at an altitude of 661 m and dominates the surrounding hilly landscape. It includes a hospital and the headquarters of the University of Camerino which are considered important institutions for the inner areas of the Marche Region between the Apennines (Italian mountains) and the coastal areas near the Adriatic Sea.

After the seismic sequence that struck Central Italy from August to October 2016, the entire population of the Camerino's Old Town was temporarily displaced as a consequence of housing and other property lost or rendered uninhabitable. Some people were relocated to housing in other towns with national funds allocated to support the payment of residential rent. Others were temporarily re-housed in pre-cast buildings located in emergency reception areas.

The Old Town is the focus for the ARCH project. This area is situated at the top of a hilly ridge and enclosed within the city's medieval defensive walls. The Old Town of Camerino contains a very large number of historic buildings, churches and artworks, with considerable artistic, architectural and historical value, which could benefit from methods and tools to improve their management and preservation. Thus, the overall aim for the ARCH project is to mitigate the impact of natural hazards on the Old Town by developing knowledge and tools for monitoring and preserving these significant cultural heritage assets.



Figure 1. Camerino municipality area [1].

#### **1.1. Demographic features**

The population of Camerino's municipality stands at 6,852 (2018) with similar numbers of male and female inhabitants (Table 1). The Old Town had a total of 760 inhabitants up to the last seismic event in 2016. Camerino's population trends are reflected in Table 2. The municipality has noted a population decline, especially after the seismic events that occurred in 2016 (Figure 2).

| Gender | Before Earthquake<br>(September 2016) | After Earthquake<br>(November 2016) | 2018  |
|--------|---------------------------------------|-------------------------------------|-------|
| Male   | -                                     | -                                   | 3,360 |
| Female | -                                     | -                                   | 3,492 |
| Total  | 7,016                                 | 6,991                               | 6,852 |

Table 1. Data of population (Camerino) after the last seismic events that occurred in 2016 (2018) [2].

| Year | Population |
|------|------------|
| 1971 | 8,499      |
| 1981 | 7,975      |
| 1991 | 7,320      |
| 2001 | 6,858      |
| 2011 | 6,897      |

Table 2. Demographic development of Camerino from 1971 to 2011 (2018) [2].

The demographic development of the municipality of Camerino was impacted by a depopulation trend, related to a mass relocation process from the internal areas of the Marche Region to coastal areas and to other bigger cities (Figure 3). In general, due to economic and social reasons, the population growth rate can be considered negative for the municipality. In fact, several migrant flows can be identified both for Camerino and the area near the Apennines. The first occurred during the first decades of the twentieth century as a result of economic conditions in the rural areas. The second migration flow happened after the Second

World War; away from the rural areas and towards the valleys, the industrialised areas of the big towns and the coastal areas that offer greater job opportunities and better services.



Figure 2. Population trend of Camerino (2001-2018) [3].

These phenomena resulted in a progressive aging of the population; a phenomenon reflected both in Camerino and the Apennine area of the Marche Region. The data concerning population density for the Marche Region (Figure 3) highlights the high density (orange and red colour) for the biggest cities in the coastal areas and for the industrialised zones; low population density characterises the internal zones (pink and yellow colour).



Figure 3. Population density (2018) of Marche Region [4].

After the Central-Italy seismic sequence (2016), the entire population of the Old Town was temporarily displaced due to property/housing lost or rendered uninhabitable.

An analysis conducted on 25<sup>th</sup> September 2019 [5] highlights that a large number of people, approximately equal to 2,242 inhabitants, had obtained funds to support rental payments in temporary residences. As previously mentioned, approximately 1,179 inhabitants were relocated to other towns with national funds to support residential rent, whereas others were temporarily relocated to emergency reception areas. The result has been a low population density in the municipalities inside the areas that were interested by the seismic events in 2016 (Figure 4).



#### Figure 4. Population density (2018) of Marche Region [3].

The natural growth rate of Camerino's population (Table 3) is negative (-8.10%) and it is lower than the average value of the Marche Region; the internal migration rate is negative (-11.6%) principally due to the economic and social effects of the last seismic events in 2016.

| Growth rate               | Municipality of Camerino | Marche Region |
|---------------------------|--------------------------|---------------|
| Natural growth rate (‰)   | -8.1                     | -4.6          |
| Internal migrant rate (‰) | -11.6                    | -0.1          |
| Foreign migrant rate (‰)  | 6.8                      | 2.4           |
| Total growth rate (‰)     | -15.1                    | -4.2          |

Table 3. Population growth rate (2018) of Camerino and of Marche Region [3].



Figure 5. Foreign inhabitants (2018) of Camerino [3].

The collected data (Figure 5) highlights the increment of foreign inhabitants in Camerino who principally come from Europe, Africa and Asia (Table 4). The total growth rate of Camerino's population is negative (Table 3) and it is higher than the average value for the Marche Region.

Approximately, half of the population is in the age range 45-84 with a life expectancy of about 83 years (see Table 5). The percentage of inhabitants in the age range (0-14) is equivalent to 9.7% (Figure 6). The old age indicator is equal to 280.1 (Figure 7): a high value that is similar to other municipalities of the areas that were struck by the seismic sequence (2016) in the southern part of the Marche Region. Additional data on Camerino's population is shown in Figure 8.

| Native land                   | Municipality of Camerino | Marche Region |
|-------------------------------|--------------------------|---------------|
| Europe                        | 41.1%                    | 53.7%         |
| Africa                        | 24.6%                    | 19.9%         |
| Asia                          | 30.0%                    | 20.9%         |
| America                       | 4.0%                     | 5.5%          |
| Oceania and stateless persons | 0.22%                    | 0.04%         |

Table 4. Native land of foreign inhabitants (2018) of Camerino [3].

| Age Range | Number of people | Percentage |
|-----------|------------------|------------|
| 0-5       | 232              | 3.41 %     |
| 6-17      | 609              | 8.97%      |
| 18-24     | 358              | 5.27%      |
| 25-34     | 957              | 14.10%     |
| 35-44     | 839              | 12.36%     |
| 45-64     | 1,921            | 28.31%     |
| 65-84     | 1,526            | 22.49%     |
| + 85      | 342              | 5.04%      |

Table 5. Average age distribution, excluding university students (2020) [2].



Figure 6. Percentages of inhabitants of Marche Region (2019) for the age range (0-14) [4].



Figure 7. Old age indicators of Marche Region (2019). This indicator is equal to the number of inhabitants with age higher than 65 years respect to 100 inhabitants of age lower than 14 years [4].



Figure 8. Population of Camerino (2016) divided for age, male and female, unmarried, married, widows and divorced [6].

#### **1.2. Economic features**

Figures 9 and 10 below show the development of enterprises and the corresponding sectors in Camerino. The number of enterprises reflected a light decrease since 2010 (Figure 9) both due to the international financial crisis (2008) and to local reasons. Small companies, often family-run, are responsible for most commercial activity in Camerino. Following the 2016 seismic event, several stores located in the Old Town closed and were relocated to new sites financed by national funds. According to statistics, the most prevalent service sectors in Camerino's municipality in 2018 were agriculture and silviculture, followed by commerce, construction, and lodging and food services (Figure 10). The size of the rural area is a significant determinant of the rate of activities in agriculture and forestry. The increment of the average age of the farmers employed in this sector is due to both demographic and cultural reasons. The economic vitality of the urban area is closely linked to the University: the presence of numerous students is very important for local economic activities. Tourism is a developing sector that is focused both on cultural heritage from the Renaissance period, and on the preservation of the natural landscape. The industrial sector, comprising only a few small companies, is very modest. On the other hand, the number of handcraft enterprises (manufacturing activities in Figure 10) is relevant. The distribution of Camerino's enterprises has a similar trend to those of other areas of the Marche Region that were struck by the last seismic sequence (Figure 11).



Figure 9. Number of enterprises from 2009 to 2016 for the municipality of Camerino [7].





#### Figure 10. Distribution of Camerino's enterprises (2018) [3].

Figure 11. Distribution of enterprises of the Marche Region (2018) [3].

After the decrease in the number of enterprises due to the seismic sequence that occurred in 2016, the growth rate (Figure 12) displays a substantial equilibrium for the year 2018. Commercial and manufacturing centres have been built with national financial funds in order to allow the relocation of some activities. The taxable income of Camerino (Table 6) includes activities related to the tertiary sector, as a direct result of the presence of the local University which is important for a small municipality like Camerino.



| Taxable income for contributor | Taxable income for inhabitants |
|--------------------------------|--------------------------------|
| 21,502€                        | 14,621 €                       |

Figure 12. Growth rate (%) concerning the number of enterprises for the Marche Region (2018) [4].

Table 6. Taxable income (2017) for the municipality of Camerino [3].

#### 1.3. Vulnerabilities and risks

The municipality of Camerino identifies the elderly as the most socially vulnerable population group (adults over 65). Prior to the seismic sequence that struck Central Italy from August to October 2016, many such elderly people lived in Camerino's historical centre, and were hence part of the relocation to temporary housing or to other towns mentioned earlier. Older adults may be the most vulnerable to natural disasters and emergency events, such as the seismic events in Central-Italy (2016). Since then, the municipality of Camerino has supported initiatives to improve the psychological health of inhabitants, especially for younger persons. Furthermore, the local University has provided funds to support students through online courses. There is not a significant number of homeless people due to the limited parameters of the urban area; furthermore, access to the Old Town has been prohibited since the last seismic sequence (2016). Inhabitants with economic difficulties are supported by municipal and ecclesiastical institutions, while families and small companies that were relocated after the 2016 seismic events are supported by national funds (as mentioned earlier). However, a spatial mapping/analysis of vulnerable population groups/areas in the municipality currently does not exist.

In terms of the built fabric of Camerino, many buildings located in Camerino's historic centre pre-date 1974 (Table 7) when seismic standards became obligatory. The time needed to complete the post-earthquake rebuilding process will influence the future possibility of people returning to Camerino's urban area. This issue will also influence the social and economic profile of Camerino in coming years.

In response to the risk of seismic activity, the municipality of Camerino has mapped the following:

- Emergency response procedures and responsibilities in the city;
- Preliminary cultural heritage protection strategies and key legislation.

Additional mapping activities that could be useful to the municipality in building its resilience include the mapping of:

- a) existing cultural heritage protection measures, strategies and key legislation in the city;
- b) existing databases on natural risk information for the city; and
- c) decision-making structures in the city regarding cultural heritage protection.

| Construction age | % of residential buildings |
|------------------|----------------------------|
| < 1918           | 43.0%                      |
| 1919-1945        | 13.4%                      |
| 1946-1960        | 6.2%                       |
| 1961-1970        | 6.7%                       |
| 1971-1980        | 9.2%                       |
| 1981-1990        | 6.5%                       |
| 1991-2000        | 7.6%                       |
| 2001-2005        | 3.7%                       |
| > 2006           | 3.7%                       |

Table 7. Construction age of residential building (2011) of Camerino [3].

### 2. Target historic areas identified for ARCH

#### 2.1. Overview

The municipality of Camerino's territory (Province of Macerata, Marche Region, Italy) is centrally located between the rivers Potenza and Chienti (Figure 13). The territory of Camerino is characterised by large areas with high naturalistic and environmental value.



Figure 13. Camerino's geographic location [1].

For the purposes of the ARCH project, the city case of Camerino will focus on the entire Old Town (Figure 14). The Old Town is well defined by its physical area; it is situated at the top of a hilly ridge and enclosed within the ancient walls which represent the town's medieval defensive perimeter. The old town of Camerino is a historical urban centre (300 B.C.) that was expanded during the Roman Age. The current road network design is essentially based on the medieval pattern. The urban morphology of the Old Town features a compact and continuous urban context, characterised by a high building density and irregular, jagged road network of medieval origin. The Old Town has a surface area of 150,000 m<sup>2</sup> and contains a very large number of buildings, churches and monuments, some of them of considerable artistic, architectural and historical value. Figure 15 illustrates the location of key buildings within the

Old Town, among them the Ducal Palace and Santa Maria in Via Church, which are discussed in detail later in this chapter.



Figure 14. Urban centre of Camerino (MC, Italy) [8].



Figure 15. City map of the old town, showing locations of key buildings St. Maria in Via's Church and the Ducal Palace [1, 9, 10, 11].

#### 2.2. Key stakeholders

Local stakeholders relevant to the ARCH project's focus on cultural heritage, disaster risk reduction and climate adaptation have been separately mapped, and more information can be found in related ARCH deliverable D3.2: local partnership and work plan. Table 8 below

presents the different entities involved in the management and maintenance of cultural heritage, as well as civil protection and disaster recovery in the municipality of Camerino.

| No. | Institution  | Description  |
|-----|--|--|
| 1   | Civil Protection Office of<br>Camerino (COC) [8]                                       | First authority that organises, under the supervision of the mayor, disaster or emergency response, before the successive and possible interventions of the regional and national civil protection departments. The COC is divided into nine offices that have several supportive tasks: |
|     |  | a. Technical and planning tasks;   |
|     |  | b. Health and veterinary assistance;   |
|     |  | c. Local voluntary organisations;  |
|     |  | d. Material resources and logistics;   |
|     |  | e. Main networks (electric, hydric, etc.) and school services;   |
|     |  | f. Preliminary damage evaluation;  |
|     |  | g.Operability of the main roads;   |
|     |  | h. Telecommunication networks;   |
|     |  | i. Preliminary assistance to population.   |
| 2   | Civil Protection Office of<br>Marche Region [12]                                       | Authority that organises emergency response at regional level concerning health assistance, material resources and logistics, assistance to the population, etc.   |
| 3   | Episcopate (diocese) of<br>Camerino [13]   | Manages local churches, some artwork museums and local refuges.  |
| 4   | Superintendence of<br>Architectural and<br>Landscape Heritage of<br>Marche Region [14] | Manages, at regional level, architectural heritage, museums and<br>natural reserves. This authority approves private and public<br>activities that involve cultural heritage.  |
| 5   | Office for Reconstruction<br>[15]  | Manages, at regional level, urban planning and related financing,<br>and authorises technical design and funds for the reconstruction of<br>private and public buildings (as for the last seismic sequence in<br>2016).  |
| 6   | Ministry of Cultural<br>Heritage and Activities,<br>and Tourism (MIBACT)<br>[16]       | Coordinates the activities of the regional secretariats that supervise<br>the management of cultural heritage. The MIBACT regulates the<br>management of architectural heritage, museums, landscape<br>preservation, etc.  |

Table 8. Entities that are involved in the management and maintenance of cultural heritage.

Two buildings have been selected as case studies for the ARCH project due to their historical and representative values: the Ducal Palace and Santa Maria in via Church. These are described next.

#### 2.2.1. Ducal Palace

The Ducal Palace (Figure 16) is an example of the evolution of different Italian architectural styles from the 13<sup>th</sup> to 15<sup>th</sup> century, and was built in three periods: the Case di Gentile (13<sup>th</sup> century), the Palazzo di Venanzio (14<sup>th</sup> to 15<sup>th</sup> century) and the Case Nove or 'Palazzo di Giulio' (15<sup>th</sup> century). Camerino's Ducal Palace is among the notable buildings of civil architecture built by the Da Varano family and it is now home to the local University. It has an original section, which was rebuilt in the late fourteenth century, and was extended and completed in the mid-to-late fifteenth century in the Renaissance style. The whole building is centred on a square-portico courtyard (Figure 17) possibly designed by Baccio Pontelli, a Renaissance architect, and can be accessed via several rooms, including the "Sala degli Stemmi" a room with coats (Figure 18).



Figure 16. The Ducal Palace [9].



Figure 17. The square-portico courtyard of the Ducal Palace [17].



Figure 18. The "Sala degli Stemmi", a room with coats inside the Ducal Palace.

With the fall of the duchy (1545), the palace became the seat of the papal governors and, from 1749 onwards, of the University. Some semi-buried tunnels bridge the slope of the hill and emerge onto the main cathedral square. The interior of the Ducal palace is characterised by cellars, dungeons, a monumental spiral staircase, an enormous cistern, rooms dating back to various epochs (some of which are richly frescoed) and a viewing platform. The palace was damaged by the 2016 seismic event (Figure 19).



Figure 19. External (a) and internal (b) damage to and collapse of masonry (Ducal Palace) [9].

#### 2.2.2. Santa Maria in Via Church

The Santa Maria in Via Church (Figure 20) was originally a little chapel, like many others along the pilgrimage's road of Via Romea, offering protection and viaticum to pilgrims who were leaving or passing through. The current church was built between 1639 and 1624 based on a design by Camillo Arcucci da Sigillo, in response to the wish of Cardinal Angelo Giori, secretary of Pope Urbano VIII Barberini. The simple brickwork facade with triangular pediment and two superimposed floors is vertically decorated with pilasters. The perimeter walls of the interior elliptical plant, which draws inspiration from Bernini, are enriched by semi-circular chapels, each of which houses three canvases (17<sup>th</sup> century). The main altar has the venerated picture of Saint Maria in Via; a canvas in Byzantine style painted on wood from the Umbria and Marche school dating back to the 18<sup>th</sup> century. Among its most prestigious works, the Church keeps two canvases (vestries) of Valentin de Boulogne who was a 17<sup>th</sup> century disciple of Caravaggio: they represent Saint Giovanni Battista and Saint Girolamo.



Figure 20. (a) Facade of St. Maria in Via Church and (b) the provisional steel structures that were put up in order to reinforce the remaining structures [9].

An earthquake in 1799 destroyed the brickwork vault, which was then replaced by one made of "camorcanna" (thin vaults usually made by mats of reeds nailed to an upper wooden framework) with historical plasters decorated by Giuseppe Rinaldi. The oratory has preserved a copy of the Sacra Sindone (Holy Shroud) realized in 1658. Due to the seismic sequence in 1997, the church suffered much damage, among which was the detachment of the facade. After careful restoration works, it was opened again to the public in 2007. The latest seismic sequence in 2016 resulted in new, severe damage (Figure 21 and Figure 22).



Figure 21. Collapse of the bell-tower of St. Maria in Via Church [9].



Figure 22. Collapse of the roof and of the decorated thin vault of St. Maria in Via Church [9].

#### 2.3. Particular challenges and climatic hazards affecting the sites

Relevant climatic hazards include the impact of snow precipitation in the winter seasons on the effectiveness of the main networks (electricity, communications, etc.). Furthermore, two major seismic sequence in a little over two decades (most recently in 2016, as already highlighted, but also earlier in 1997) have highlighted the weakness of the urban area and its valuable cultural heritage to seismic hazards, and related geomorphological hazards (e.g. landslides). In order to address these hazards, the municipality of Camerino has developed a preliminary civil emergency plan [19] that roughly defines the general tasks of officials in emergency events and the main reception areas for citizens. In such circumstances, the role of the mayor, within the municipal territory, is as follows:

- assumes the direction and coordination of the assistance services to the population affected by the emergency;
- organises the necessary interventions immediately communicating them to the President of the Regional Council and to the President of the Province and to the Prefect;
- informs the population on the evolution of ongoing events and on the procedures foreseen in the emergency plan.

Municipal staff of Camerino have improved their knowledge of some natural hazards such as seismic hazards and geomorphological hazards (particularly landslides). As an example, a Seismic Microzonation [28] was carried out in 2018 for the historical centre. Despite this progress, some gaps and challenges remain. For example, the Municipality has the need:

- to develop a database with information about relevant hazards in order to inform civil protection strategies;
- to use a system that helps detect the historical buildings or monuments most exposed to risks;
- to prepare a list of priorities for historical buildings and artwork in order to identify repair strategies.

## 3. Governance framework for cultural heritage management

This section considers the governance framework for cultural heritage relevant the identified sites in Camerino, by illustrating existing policies, strategies and programmes for the management, protection and use of cultural heritage at the different governance levels. It also reflects on the extent to which the local commitments and action plans take into account and align to the key international governance instruments created by UNESCO.

#### 3.1. International<sup>1</sup>

At the international level, it is possible to consider the policy decisions and the main directives that are adopted by national laws. The Italian laws are promulgated by the Italian Parliament and they are mandatory. Some international commitments recognised by Italian law include:

- Recommendation concerning the Protection, at national level, of the Cultural and Natural Heritage of the General Conference of UNESCO adopted in 1972 and recognised by the Italian Law No. 184 of 6th April 1977;
- Convention for the Protection of the Architectural Heritage of Europe, European Treaty Series (ETS) No.121, Granada, 3rd October 1985, recognized by the Italian Law No. 93 of 15th February 1989.

There are also European Conventions that are references for archaeological heritage and heritage landscapes:

- European Convention on the Protection of the Archaeological Heritage (Revised) ETS No.143 La Valletta, 16th January 1992;
- European Landscape Convention European Treaty Series (ETS) No.176 Florence, 20th October 2000.

Some principles are reported in the following proceedings of international and European conferences:

- Convention on the Protection and Promotion of the Diversity of Cultural Expressions, General Conference of UNESCO, Paris, 2005;
- Recommendation on the historic urban landscape, General Conference of UNESCO, Paris, 2011;

<sup>&</sup>lt;sup>1</sup> <u>References (See Annex 11.1)</u>:

Italian Law n. 184 of 6<sup>th</sup> April 1977, Ratifica ed esecuzione della convenzione sulla protezione del patrimonio culturale e naturale mondiale, firmata a Parigi il 23 novembre 1972 (in Italian);

Italian Law n. 93 of 15<sup>th</sup> February 1989, Ratifica ed esecuzione della convenzione europea per la salvaguardia del patrimonio architettonico in Europa, firmata a Granada il 3 ottobre 1985 (in Italian).

• Davos declaration 2018 - Towards a high-quality Baukultur for Europe, Conference of European Ministers of Culture, Davos, 2018.

Finally, general principles for the conservation of cultural heritage are shown in the following International Charters:

- European Charter of Architectural Heritage, Amsterdam, 1975;
- Charter for the conservation of historic towns and urban areas, Washington, 1987;
- The Charter of Krakow Principle for conservation and restoration of built heritage, Krakow, 2000.

#### 3.2. National<sup>2</sup>

The Ministry for Cultural Heritage and Activities, and Tourism (MIBACT) regulates the management of archaeological and architectural heritage, museums, landscape preservation, etc. Different levels of government (state, regions and municipalities) share responsibilities for cultural heritage, according to the Italian Constitution. Cultural heritage preservation is listed among the cultural responsibilities to be retained by the state, with a few exceptions listed in article 5 of the Cultural Heritage and Landscape Code (Legislative Decree No. 42, issued 22<sup>nd</sup> January 2004, modified by Legislative Decree No. 62 of 26th March 2008). According to the Cultural Heritage and Landscape Code, MIBACT developed a specific directive in order to manage the protection and safeguarding of cultural heritage in case of disasters. Regions, municipalities and local authorities shall cooperate with the ministry in performing its protection tasks. The ministry has a superintendent role and ensures through its peripheral offices the proper surveillance and inspection of national cultural heritage. The system for landscape protection has been balanced by giving responsibility back to the state, in cooperation with regional authorities, by the Legislative Decree No. 63 of 26th March 2008. Furthermore, there are voluntary technical standards for the management of cultural heritage that are promulgated by UNI (Ente italiano di Normazione) [18]. These apply, for example, to chemical, physical and mechanical analyses of cultural heritage materials, to defining preservation and restoration methods for architectural heritage and artworks, and managing the cultural heritage and recovery area for artworks.

#### 3.3. Regional<sup>3</sup>

The Council of the Marche Region developed the regional law no. 4 of 09<sup>th</sup> February 2010 for the preservation of the regional cultural heritage. This law has the objective of regulating

<sup>&</sup>lt;sup>2</sup> <u>References (see Annex 11.1)</u>:

<sup>•</sup> Legislative Decree n. 42 of 22<sup>nd</sup> January,2004, Cultural Heritage and Landscape Code (in Italian).

Legislative Decree n. 62 of 26<sup>th</sup> March 2006, Changes on Legislative Decree n. 42/2004 concerning Cultural Heritage (in Italian).

Legislative Decree n. 63 of 26<sup>th</sup> March 2006, Changes on Legislative Decree n. 42/2004 concerning Landscape (in Italian).

<sup>&</sup>lt;sup>3</sup> <u>References (see Annex 11.1)</u>:

cultural heritage assets and related activities according to the articles no. 117 and no. 118 of the Italian Constitution and in compliance with the legislative decree no. 42 of 22<sup>nd</sup> January, 2004. With this law, the Marche Region has the task of carrying out actions to protect cultural heritage in accordance with the Cultural Heritage and Landscape Code (see Section 3.2), and to support and promote the conservation of cultural heritage by restoration, prevention and recovery actions. The superintendence of architectural and landscape heritage of the Marche Region manages, at regional level, architectural heritage and museums, and it approves private and public activities that involve cultural heritage according to national and regional laws. The seismic design of any refurbishment of architectural heritage, that was damaged by the last seismic events in 2016, needs to be approved by the regional office for reconstruction [15]. For religious buildings, the regional episcopate is also involved in management [13].

#### 3.4. Local

Camerino's council has the responsibility for planning, managing and conducting the ordinary maintenance of historical buildings and cultural heritage landscapes. While the municipality can access most of the skills and resources necessary to respond to possible disaster scenarios, gaps still exist. This is especially the case of the pre-disaster planning related to the risk management of the cultural and historical buildings and artwork collections in spite of the various local museums, historical palaces and churches that are sited in its historical urban area. Post-disaster management is mainly entrusted to the Civil Protection Office of the Camerino (COC) [19].

At present, the municipality of Camerino lacks a system that identifies the historical buildings or monuments most exposed to risks. Such a system could help to prioritise historical buildings and artworks to define preservation and intervention strategies and implement them where most needed. Furthermore, it could be useful both to define priorities concerning the evacuation of moveable heritage and to analyse suitable sites for the recovery in case of disasters.

Essential inputs could come from the UNESCO Recommendation on the Historic Urban Landscape<sup>4</sup>, which identifies specific strategies for local authorities to undertake in implementing a more holistic approach to understanding and managing heritage places in connection with the wider urban fabric, such as follows:

- To consider synergies between the recommendation and policies related to sustainable urban development i.e. local policies and regulations in place to guide harmonious integration of contemporary interventions into historic urban fabric.
- Looking at the relationship between historic urban areas and cultural diversity and social inclusion, to encourage initiatives promoting cultural diversity and/or creativity in historic urban areas.

<sup>•</sup> Regional Law n. 4 of 09<sup>th</sup> February, 2004, Laws concerning cultural heritage and activities (in Italian).

<sup>&</sup>lt;sup>4</sup> See <u>https://whc.unesco.org/en/hul/</u>



- To implement ecologically sensitive policies and practices aimed at strengthening sustainability and quality of life, looking at the relationship with natural capital.
- To safeguard intangible values of the urban heritage.
- To ensure the cooperation of a broad range of stakeholders through participatory processes and community engagement.
- To consider the importance of knowledge and planning tools, through mechanisms in place to assess the vulnerability of heritage attributes of urban areas to socio-economic pressures, climate change and disasters.
- To conduct assessment through comprehensive surveys and mapping decisionmaking processes.
- To reflect on the use of innovative financial tools and instruments.
- To promote capacity building, research, information technology and education.

### 4. Governance framework for disaster risk reduction

This section looks at the governance framework for Disaster Risk Reduction (DRR) relevant to the city of Camerino. After a first overview of the international context, it moves forward considering existing policies, strategies and action plans at national, regional and local level. It also reflects on the extent to which existing local commitments in particular are able to take into account and align to key international instrument for guiding disaster risk reduction, the Sendai Framework.

#### 4.1. International<sup>5</sup>

The Italian Civil Protection Office works together with the European Civil Protection Mechanism through the Emergency Response Coordination Centre (ECCR) that coordinates the delivery of assistance to stricken countries, such as civil protection teams and specialised equipment. The guidelines coming from these activities may be accepted also by the national and local civil protection authorities. The United Nations Office for Disaster Risk Reduction (UNDRR) [20] supports coordination mechanisms like the National Platforms for Disaster Risk Reduction and other institutions (e.g. governments, science and technology, civil society). UNDRR [20] supports the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030. The Sendai Framework [21] is a tool adopted in order to manage the transition from "disaster management" to "disaster risk management". The UNDRR [22] and the Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO) [23] define criteria for the disaster management. The DG ECHO is composed of two units: the first has the task of emergency and disaster response based on international collaborations between member states; the second unit develops frameworks in order to prevent disasters and emergency situations (e.g. training courses, exchange of knowledge and expertise, the development of new training solutions, the management of prevention projects, the coordination of public information activities and the financial planning for the two units). This system facilities cooperation between the European member states and all the activities are based on the principle of subsidiarity, i.e. several actions are undertaken through the supervision of the member state interested by natural disasters.

#### 4.2. National<sup>6</sup>

The Italian Civil Protection Office [24] is an agency of the Presidency of the Council of Ministers. The office coordinates responses to natural disasters, draft legislation on risk

<sup>&</sup>lt;sup>5</sup> <u>References (see Annex 11.2)</u>:

Decision 1313/2013/EU of the European Parliament and of the Council on a Union Civil Protection Mechanism;

Decision (EU) 2019/420 of the European Parliament and of the Council of 13 March 2019 amending Decision 1313/2013/EU on a Union Civil Protection Mechanism.

<sup>&</sup>lt;sup>6</sup> <u>References (see Annex 11.2)</u>:

<sup>•</sup> Decreto Legislativo n.1 del 02/01/2018 (Italian National Law): Codice della protezione civile (in Italian);

<sup>•</sup> D.P.C.M. 09/08/2016 (Decree of the President of the Council of Minister): organizzazione del Dipartimento della Protezione Civile (in Italian);

prevention and promotes training projects. The latest modification to the internal organisation of the Civil Protection Office occurred with the Decree of the President of the Council of Minister of August 9, 2016. The functions and services of the offices according to the current organisational chart (see Figure 23 below) have been assigned by Decree of the General Secretary of the Presidency of the Council of Ministers of August 10, 2016. The Office of the Operational Director is divided into different departments: Emergency Planning and Drills, Operational Support in Emergency, Italia Situation Room and Operations Centre for Maritime Emergencies (COEMM), Joint Air Operations Centre (COAU) and Mobility and Essential Services. In particular, the COEMM elaborates models and procedures for the National Civil Protection Service, shares information on emergency situations, evaluates the situation postdisaster, and supports in case of the declaration of a state of emergency. The COEMM department also has the task of coordinating first response activities after disasters, catastrophes or other events which, due to their intensity and extent, must be handled with immediate intervention and with special capacities and means.

With the declaration of a state of national emergency by the Council of Ministers, the Head of the Office of Civil Protection decides on the first intervention activities to implement (see Figure 23). The National Civil Protection Office consists of: State administrations, Provincial councils, Municipalities and local authorities for the management of the mountain areas. Its operating structures include: scientific research groups (including I.N.G.V. and other research institutes), technical services, voluntary organisations, the Italian Fire Brigade, the Armed Forces, the Police Force, the National Forestry Commission, the Italian Red Cross, the structures of the Italian Health Service and the National Mountain Rescue and Speleological Corps (C.N.S.A.S.). In ordinary situations, the operative structures with the departments perform the monitoring, forecasting and risk prevention activities as well as the operative interventions, each with its own specific technical skills. In situations of national emergency or when natural calamities occur, after the declaration of the state of emergency by the Council of Ministers, the Prime Minister may avail of delegated commissioners and operative structures for the necessary interventions. The management of the operative structures is assigned to the Head of the Civil Protection Office. There are national technical standards for buildings and infrastructures also in order to assess vulnerability and to reduce seismic risks [25].

Decreto del Segretario Generale della Presidenza del Consiglio dei Ministri del 10/08/2016 (Decree of the General Secretary of the Presidency of the Council of Ministers): organizzazione interna del Dipartimento della Protezione Civile (in Italian);

D.P.C.M. 20/02/2012 (Decree of the President of the Council of Minister): componenti del comitato paritetico (in Italian);

<sup>•</sup> D.P.C.M. 21/11/2006 (Decree of the President of the Council of Minister): Costituzione e modalita' di funzionamento del Comitato operativo della protezione civile (in Italian);

Legge n. 286 del 27/12/2002 (Italian National Law), Conversione in legge, con modificazioni, del D.L. 4 novembre 2002, n. 245, recante interventi urgenti a favore delle popolazioni colpite dalle calamità naturali nelle regioni Molise e Sicilia, nonché ulteriori disposizioni in materia di protezione civile (in Italian)



#### Figure 23. Organisational chart of the Civil Protection Office.

#### 4.3. Regional<sup>7</sup>

The activities of the Civil Protection Office of the Marche Region are regulated by several regional laws and decrees, such as the regional law no. 32/2001 that defines both the tasks of the local authorities and the operative procedures for emergency management. The main tasks of the Civil Protection Office of the Marche Region concern programming of civil protection activities, risk prevention and rescue. Regional skills, concerning local security, are entrusted to the civil protection system. When emergencies occur, the Civil Protection Office of the Marche Region defines the tasks of the local authorities and coordinates their activities. The Civil Protection Office of the Marche Region has three main boards: Multi-risks Office, Regional Operative Office (SOUP) and the Emergency Service Centre (CAPI) (see Figure 24 for organisational structure).

#### 4.3.1. Multi-risks Office

This Office contributes to ensuring the management of the national alert system for weather, geological and hydraulic risk. Its main task is to support the decisions of civil protection

<sup>&</sup>lt;sup>7</sup> <u>References (see Annex 11.2)</u>:

<sup>•</sup> Legge Regionale n. 32 del 11/12/2001, Sistema regionale di protezione civile, B.U.R. n. 146 del 20/12/2001, (in Italian).

<sup>•</sup> Legge Regionale n. 13 del 03/04/2015, Disposizioni per il riordino delle funzioni amministrative esercitate dalle Province, B.U.R. n. 33 del 16/04/2015, (in Italian).

<sup>•</sup> Decreto del Presidente della Giunta Regionale nº 41 del 01/02/2005, (in Italian).

authorities. The primary functions of the Office are the monitoring and surveillance of events, as well as weather, geological and hydraulic risk assessment.

The monitoring activities of the Office are based on local and national networks, such as the seismic events recorded by the monitoring network of the National Institute of Geophysics and Volcanology (INGV).

#### 4.3.2. Regional Operative Office (SOUP)

The Regional Operative Office (SOUP) consists of officials from the Civil Protection Department, Fire-Department, State Forestry Commission, Italian Red Cross, and the National Health Service. The SOUP holds networks for the remote control of the area (hydrology, seismic) and databases necessary for the management of civil protection emergencies.

#### 4.3.3. Emergency Service Centre (CAPI)

The Emergency Service Centre (CAPI) of the Marche Region is a permanent operating structure that has warehouses for the storage of emergency supplies to be used when calamitous events occur. The main aims of the centre are the acquisition, storage, and protection of supplies and equipment for civil protection.





The Prefect of Macerata (the province that includes Camerino municipality) has civil protection tasks within the provincial territory. When a calamity occurs, the Prefect – together with different authorities of the Civil Protection Department – guarantees first aid services and emergency management also by firefighters and law enforcement. If the emergency is more complex, a Coordination Centre (CCS) is activated at the Prefecture; this centre is a temporary structure for the duration of the emergency, and aims to coordinate and connect the measures that are adopted by different local authorities. Finally, the Prefect prepares emergency plans for factories susceptible to high risk levels.

Furthermore, in the Marche Region there are eight local authorities that manage the mountain areas. These are institutions made up of some municipalities that share funds for guaranteeing the main social and economic services to the population, managing land use zoning and planning, and preserving landscapes and ecosystems (see Figure 25).



Figure 25. Local authorities for the management of the mountain areas (Marche Region) [26].

#### 4.4. Local<sup>8</sup>

The Civil Protection Office of Camerino (COC) is the first authority that organises the response to a disaster or to an emergency, before potential following interventions of regional and

<sup>&</sup>lt;sup>8</sup> <u>References (see Annex 11.2)</u>:

Civil protection plan, approved by council's deliberation n. 61 of 22<sup>nd</sup> December, 2008, according to Italian Law n. 225 of 24<sup>th</sup> February, 1992.

national civil protection departments. When an emergency occurs, the COC activates the different support operation structures. The mayor is the head of COC within the municipality.

The municipal civil protection plan includes the main baseline information on the territory: natural hazards, with particular reference to seismic hazard, geological and hydraulic hazard, fires, heavy snowfalls and heat waves. Furthermore, the plan lists the objectives to be achieved to guarantee the first ordinary response to emergency interventions, aiming at safeguarding the population and the territory and the intervention model steps, defining roles and responsibilities.

#### 4.5. Gaps and needs

Considering the objectives of the ARCH project, it would be essential to conduct new geological and geophysical surveys in order to more accurately identify hazard scenarios. The same data would then be essential for the construction of a "geological model" of extreme detail, functional also for future studies on the local seismic response and to define a risk map of the Camerino's Old Town. The municipality has the need to develop a database with this information for its civil protection strategies.

As previously mentioned, the Sendai Framework sets out four main priorities for intervention<sup>9</sup>, with associated desired actions and proposed strategies, some of which target local governments:

Priority 1: Understanding disaster risk

Priority 2: Strengthening disaster risk governance to manage disaster risk

Priority 3: Investing in disaster risk reduction for resilience

*Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.* 

Overall, some efforts in Camerino can be recognised in relation to the assessment of risks (although lacking of GIS-database of the historical buildings and moveable heritage most exposed to risks) and effective management during the emergency scenario, acting as first responders even before regional and national institutions. Significant further investments and priority could be given to improving mechanisms to foster coordination across institutions, as well as disaster risk reduction strategies and the reconstruction plan for the historical urban area interested by the last seismic events (2016), through community involvement. Thus, it could be useful to develop impact scenarios due to the main hazards, by GIS-based decision support tools, to improve the current knowledge and to define future strategies that could be useful to preserve the cultural heritage from future disasters.

<sup>&</sup>lt;sup>9</sup> See <u>https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030</u>

## 5. Governance framework for climate change adaptation

This section looks at the governance framework for climate change adaptation of relevance to the City of Camerino. It elaborates on the relevant policies, strategies, visions and action plans for climate change adaptation at the different governance levels. It concludes with a reflection on the extent to which local governance of climate change adaptation takes into consideration key international governance instrument, the 2015 Paris Agreement.

#### 5.1. International

At the international level, it is possible to highlight some fundamental strategies and visions, which helped drive climate action. These documents are accepted and recognised by Italy, as a member of the United Nations (U.N.) and the European Community. They affect the national level and should be taken into account in local actions as well. Two international levels can be defined: a global level with the Kyoto Protocol, the 2015 Paris Agreement and its successive processes and meetings and a European level with some fundamental directives: EU Directive 2003/87, EU Directive 2012/27, EU Directive 2018/844 and more specific regulations provided by the European Energy Agency like documents relevant to environmental policy in Europe which set out the environmental objectives, targets and reporting obligations with data and indicators. Of particular relevance is the EU Adaptation Strategy (2013). The evaluation package comprises a report on the implementation of the EU Strategy on adaptation to climate change COM (2018)738, the Evaluation of the EU Strategy on adaptation to climate change SWD (2018)461, and the Adaptation preparedness scoreboard Country fiches SWD (2018)460. The evaluation found that the EU Adaptation Strategy has been a reference point to prepare Europe for the climate impacts to come, at all levels. It emphasised that EU policy must seek to create synergies between climate change adaptation, disaster risk reduction efforts and sustainable development to avoid future damage and provide for long-term economic and social welfare in Europe and in partner countries.

#### 5.2. National

In Italy, the protection of the environment, ecosystems and cultural resources is under the exclusive competency of the central government. The *Ministry for Environment, Landscape and Sea* (IMELS) carries out activities on climate change at the national and international level.

The Italian governance framework for adaptation to climate change can be considered as very fragmented with several laws and regulations in which actions, strategies and regulations have been partially provided for different aspects (mobility and transportation, energy use, energy production, waste management, marine cost management, greenhouse gas emissions, etc.) and in different ways without an overall and comprehensive vision. Specifically related to climate change are the Legislative Decree 216/2006 and the National Adaptation Strategy (NAS).

The NAS from 2014 includes the following:

- The state of scientific knowledge on impacts, vulnerability and adaptation to climate change in Italy;
- Analysis of the EU and national legislation relevant to impacts, vulnerability and adaptation to climate change;
- Elements for a National Strategy for Adaptation to Climate Change.

The NAS is a tool for encouraging adaptation actions in planning activities at national, regional and local levels. After approval from the "State-Regions Unified Conference" on 30<sup>th</sup> October 2014, the NAS was finally adopted in June 2015 by a Directorial Decree of the Climate and Energy General Directorate, establishing specific objectives to be reached by 31st December 2016.

Based on the NAS, the Ministry of Environment started in 2017 to provide an Italian National Adaptation Plan for Climate Change (NAP). The Directorate General for Climate and Energy of IMELS is currently working on the implementation of the NAS through the NAP, developed with the support of the *Euro-Mediterranean Centre on Climate Change* (CMCC). The NAP was drafted in December 2016. During 2017 and the first half of 2018, IMELS carried out a check on the draft NAP by a consultative process involving national, regional and local authorities, universities, research centers and other stakeholders. The approval of the NAP is occurring through an Agreement with the State-Regions Conference. The NAP provides some preliminary institutional guidelines [27] to national and local authorities for the elaboration of regional strategies or plans and for the integration of climate change adaptation within spatial and sectorial planning.

#### 5.3. Regional

For the Marche Region, it is possible to cite two guidelines related to the management of and adaptation to climatic changes: the Regional *Environmental and Energy Plan* from 2016 and the *Regional Plan for Climate* from 2007. The *Regional Environmental Energy Plan* identifies the guidelines for environmental energy policy in the regional territory:

- to respect the "burden sharing" legislation (Ministerial Decree 15th March 2012 and Ministerial Decree 11th May 2015)<sup>10;</sup>
- to respect the "ex ante conditionality" for the use of the structural funds energy sector, as established by the regional operative program (POR)11 and the Rural Development Plan (RDP) 2014-2020.

The *Regional Plan for Climate*, made in 2007 but still in draft, intends to systemise and make more effective the climate change mitigation policies. Targets of the plan are:

<sup>&</sup>lt;sup>10</sup> These laws implemented the legislation of the European Strategy 20.20.20 on climate and energy and

Legislative Decree 28/2011 on the promotion of the use of the energy from renewable sources.

<sup>&</sup>lt;sup>11</sup> http://www.regione.marche.it/Entra-in-Regione/Fondi-Europei/FESR/Programma-Operativo-Por-FESR
- energy efficiency to direct the construction market towards the design and construction of zero-emission buildings and favours the use of cogeneration and smart systems in the industrial, civil and tertiary sector;
- renewable sources to improve the biofuels, micro-wind and geothermal sectors applied to the civil sector and the recovery of energy contained in the organic waste fraction biogas;
- sustainable mobility and urban development to reduce the need for travel by private transport and favours the transition from the use of private transport to public transport by supporting mobility plans, surface metros and carpooling;
- efficient use of resources to minimize the consumption of resources and energy per unit of product and service, supporting Life Cycle Analysis (LCA), green public procurement, separate waste collection at home and a green tax reform;
- other measures to increase the knowledge culture and awareness of the importance of individual political choices and behaviours in facing the climate challenge.

#### 5.4. Local

At the local level, although no detailed plan for climate change adaptation is in place, the national and regional laws concerning the energy management and the preservation of the natural and urban landscapes are adopted. The *Office for Environment and Public Works* can be considered as the local public service most suited to manage possible activities about climate change adaptation. Considering the local land use policy and the management of natural areas as part of the governance for climate change adaptation, it is possible to cite the Forest Fire Emergency Plan (2018) through which the municipality of Camerino plans and manages risks from forest fires. It is a local program for protecting the integrity of life, property, settlements and the environment from damage or from dangers resulting from natural disasters, catastrophes and other events. The current Snowfalls Emergency Plan allowed to basic effectiveness of the urban infrastructures, especially those of the Old Town, during the last important heavy snowfalls. The mayor and the city council are able to propose, draft and enforce actions needed within the municipality's territory, as long as they do not contradict regional and national plans and laws.

#### 5.5. Gaps and needs

There are no detailed studies, surveys, and assessments related to climate change impacts for the municipality of Camerino. Existing records about the status and condition of cultural heritage assets, such as historical buildings, monuments, landscapes, ecosystems and environment have to date not considered the impacts and effects of climate change. Reasons for the lack of assessments on climate change impacts could be economic as well as the (possibly related) absence of effective monitoring systems. Otherwise, the civil protection strategies for the post-emergency management (i.e. fires, heavy snowfalls, heavy rainfalls, etc.) are well defined.

The Paris Agreement, addressing crucial areas necessary to combat climate change, largely targets climate mitigation and directly addresses nation states, with a focus on parties to the agreement's nationally-determined contributions to emissions reduction.

Article 7 and 8 of the agreement, however, deal explicitly with climate adaptation, and with the loss and damage associated with climate impacts. Both articles highlight the need of cooperation to enhance understanding (of potential risks and vulnerabilities) and necessary adaptation measures to be implemented.

Article 7 notes the following areas of cooperation between parties:

(a) Sharing information, good practices, experiences and lessons learned, including, as appropriate, as these relate to science, planning, policies and implementation in relation to adaptation actions;

(b) Strengthening institutional arrangements, including those under the Convention that serve this Agreement, to support the synthesis of relevant information and knowledge, and the provision of technical support and guidance to Parties;

(c) Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making;

(d) Assisting the institutions in the identifying effective adaptation practices, adaptation needs, priorities, support provided and received for adaptation actions and efforts, and challenges and gaps, in a manner consistent with encouraging good practices; and

(e) Improving the effectiveness and durability of adaptation actions.

Article 8 notes that 'areas of cooperation and facilitation to enhance understanding, action and support may include:

- (a) Early warning systems;
- (b) Emergency preparedness;
- (c) Slow onset events;
- (d) Events that may involve irreversible and permanent loss and damage;
- (e) Comprehensive risk assessment and management;

(f) Risk insurance facilities, climate risk pooling and other insurance solutions;

- (g) Non-economic losses; and
- (h) Resilience of communities, livelihoods and ecosystems.

The above fields of action can be understood as a framework in which actions at national level are expected to be taken. In that sense, they are of limited use as an implementation guide for local governments. It could be expected that national governments would be working to establish national policy frameworks for action that will in turn demand to implement complementary strategies at regional and local levels. Due to the absence of an official body dealing with climate change established within the local administrative council, the author was not able to identify direct linkages between the National Adaptation Plan (NAP) and potential future adaptation commitments at the municipality level.

# 6. Expected impacts of climate change-related and natural hazards

The purpose of this section is to report and review the preliminary collection of relevant information about hazards, exposed elements, as well as impacts provided by the municipality of Camerino in collaboration with the University of Camerino as their local research partner, in order to offer an initial overview of the risks that might affect the selected historic areas and their communities. It should be noted that the content in this section is not exhaustive, but rather should be understood as a departure point to serve as a basis for future work.

This section is structured as follows: a description of the methodology is provided, followed by a Risk Profile Table, outlining hazards, exposed elements, impacts, and corresponding resilience-building measures already planned or implemented to date. Next follows a review, interpretation, and validation of the information provided in the Risk Profile Table. Finally, an outlook is provided concerning further risk analysis work in the context of the ARCH project.

#### 6.1. Methodology

In order to elicit relevant information for risk analyses from the municipality of Camerino, ENEA, Fraunhofer, ICLEI, and Tecnalia developed a Risk Profile Table template (see Section 6.2) based on the central risk components identified in the 5<sup>th</sup> Assessment Report of the Intergovernmental Panel on Climate Change: hazards, exposed elements, impacts (physical, societal, functional, economic, and intangible), as well as corresponding resilience-building measures already planned or implemented to date.

This template was filled out by the Camerino city partners and it provides a starting point from which to conduct more detailed risk analyses. Furthermore, it allows to provide a useful starting point for the data, models, methods, and tools to be developed during the ARCH project. The information provided in the Risk Profile Table was reviewed and harmonised by ENEA in order to provide a comparable description across all city cases and ensure relevance to (and validity for) similar on-going and/or future initiatives<sup>12</sup> and projects in the field of disaster risk reduction, climate change adaptation, and cultural heritage preservation.

The following standards, reference material, and tools were identified as most suitable for this exercise:

- The City Climate Hazard Taxonomy<sup>13</sup> for classification of hazards;
- The UNDRR QRE Tool<sup>14</sup> and ISO standard 37120<sup>15</sup> for the classification of exposed elements and impacts;

<sup>&</sup>lt;sup>13</sup> https://www.c40.org/researches/city-climate-hazard-taxonomy

<sup>&</sup>lt;sup>14</sup> https://www.unisdr.org/campaign/resilientcities/toolkit/article/quick-risk-estimation-qre

<sup>&</sup>lt;sup>15</sup> https://www.iso.org/standard/68498.html

 The ICOMOS CCHWG<sup>16</sup> classification and INSPIRE<sup>17</sup> directive for the classification of heritage assets.

Based on the harmonised information, initial proposals for risk analysis focus actions (e.g. which methods and tools to apply for which part/issue of a historic area) were formulated by ENEA. The initial proposals will be further defined during the co-creation process and in exchange with the relevant local stakeholders.

<sup>&</sup>lt;sup>16</sup> https://adobeindd.com/view/publications/a9a551e3-3b23-4127-99fd-a7a80d91a29e/g18m/publication-web-resources/pdf/CCHWG\_final\_print.pdf

<sup>&</sup>lt;sup>17</sup> INSPIRE, Infrastructure for Spatial Information in EuropeD2.8.III.2 Data Specification on Buildings – Technical Guidelines (5.3.1.1.4. Classification of buildings, pages 43-45).

#### 6.2. Risk Profile Table for Camerino

| Heritage site<br>(historic area) | Hazard <sup>18</sup>        | Exposed<br>element <sup>19</sup>  | Impacts  |  |   |   |   | Corresponding resilience-<br>building measure undertaken   | Notes/Evidence   |
|----------------------------------|-----------------------------|---|--|--|---|---|---|--|------------------|
|                                  |                             |   | Physical   | Societal   | Functional  | Economic  | Intangible  | Description (please indicate specific S or general G)  |                  |
| Old town<br>(Camerino)           | Seismic hazards             | Cultural heritage<br>(churches,<br>historical<br>buildings, palaces<br>etc.).<br>Intangible cultural<br>heritage.<br>Private and public<br>buildings.<br>People.<br>Transportation<br>systems (road<br>and railroad<br>networks).<br>Infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).<br>Natural<br>environment<br>(groundwater<br>level and<br>earthquake-<br>induced<br>landslides). | Damage to<br>cultural heritage<br>assets<br>(churches,<br>historical<br>buildings,<br>palaces etc.) and<br>private buildings.<br>Damage to<br>transportation<br>systems (road<br>and railroad<br>networks).<br>Damage to<br>infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).<br>Degradation of<br>natural<br>environment. | Injury and death.<br>Possible effects<br>on mental health<br>(depression due<br>to lifestyle<br>modification).<br>Loss of personal<br>effects.<br>Loss of access to<br>key services. | Functionality loss<br>of transportation<br>systems (road<br>and railroad<br>networks).<br>Functionality loss<br>of infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).<br>Reduced<br>functionality of<br>school and other<br>public services. | Loss of tourism<br>revenue due to<br>service<br>disruptions.<br>Interruption of<br>commerce and<br>tertiary sector. | Loss of cultural<br>and artistic<br>values and<br>traditions (also<br>related to loss of<br>artworks and<br>cultural heritage). | Civil emergency management<br>plan (G).<br>Seismic Microzonation (S).<br>Funding for retrofit and seismic<br>upgrade of buildings (G). | [19], [28], [29] |
| Old town<br>(Camerino)           | Geomorphological<br>hazards | Natural<br>environment.   | Loss of natural environment.   | Loss of access to key services.  | Damage to ecosystems.   | Loss of tourism revenue due to  | Damage or loss<br>of area with<br>cultural value  | Land use zoning plan (S).  | [30], [31]       |

<sup>&</sup>lt;sup>18</sup> Note: the UN Office for Disaster Risk Reduction (UNDRR)'s Resilience Scorecard defines 'hazard' as 'a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation'. Of these, the ARCH project is addressing natural and climatic hazards.

<sup>&</sup>lt;sup>19</sup> Note: the UN Office for Disaster Risk Reduction's Resilience Scorecard defines 'exposure' as 'the situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas'.

| Heritage site<br>(historic area) | Hazard <sup>18</sup> | Exposed<br>element <sup>19</sup>   | Impacts   | npacts                             |   |   |   | Corresponding resilience-<br>building measure undertaken  | Notes/Evidence |
|----------------------------------|----------------------|--|---|------------------------------------|---|---|---|---|----------------|
|                                  |                      |  | Physical  | Societal                           | Functional  | Economic  | Intangible  | Description (please indicate<br>specific S or general G)  |                |
|                                  |                      | Cultural heritage<br>(churches,<br>historical<br>buildings, palaces<br>etc.).<br>Intangible cultural<br>heritage.<br>Private buildings.<br>People.<br>Transportation<br>systems (road<br>and railroad<br>networks).<br>Infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.). | Damage to<br>cultural heritage<br>(churches,<br>historical<br>buildings,<br>palaces etc.) and<br>private buildings.<br>Transportation<br>systems (road<br>and railroad<br>networks).<br>Infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.). |                                    | Functionality loss<br>of transportation<br>systems (road<br>and railroad<br>networks).<br>Functionality loss<br>of infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).<br>Damage and<br>flooding of<br>sewerage<br>systems. | decrease in<br>visitors.                                    | (also related to<br>loss of artworks<br>and cultural<br>heritage).<br>Damage to<br>natural<br>environment.    | Geological map at regional level<br>(S).<br>Protective infrastructure in place<br>for landslides that are well<br>maintained and monitored (S). |                |
| Old town<br>(Camerino)           | Heavy snowfalls      | Cultural heritage<br>(churches,<br>historical<br>buildings,<br>palaces etc.).<br>Infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).   | Damage to<br>cultural heritage<br>(churches,<br>historical<br>buildings,<br>palaces etc.) and<br>private buildings.<br>Infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).<br>Damage to public<br>green areas<br>(breaking old<br>trees).   | Loss of access to<br>key services. | Reduction<br>functionality of<br>transportation<br>systems (road<br>and railroad<br>networks).<br>Reduction<br>functionality of<br>infrastructure<br>systems<br>(electrical, gas,<br>and waterworks<br>networks etc.).                                      | Loss of tourism<br>revenue due to<br>service<br>disruption. | Loss of cultural<br>and artistic<br>values (also<br>related to loss of<br>artworks and<br>cultural heritage). | Civil emergency management<br>plan (G).   | [19]           |

#### 6.3. Preliminary classification of hazards, exposed elements and impacts

The purpose of this section is to review, interpret, validate, and harmonise the information provided in the Risk Profile Table (part 6.2) as a sound basis for the project to address Camerino's risks to cultural heritage induced by climate change and other hazards. This preliminary analysis covers:

- a) hazards;
- b) elements exposed to those hazards; and

c) main impacts that the identified hazards might cause on the identified exposed elements.

#### 6.3.1. Hazards

The identified hazards for the municipality of Camerino are recorded in Table 9 below and have been identified based on the hazard classification C40 *City Climate Hazard Taxonomy*<sup>20</sup> which is broken down into main hazard types and hazard subtypes. These are also highlighted in the preliminary resilience assessment presented in Section 7 of this report. According to this classification system, two main hazard clusters were identified in Camerino, namely: meteorological and geophysical (Table 9). As far as meteorological events are concerned, heavy snow was identified by the city as one of the main hazards in Camerino. Whereas for geophysical hazards, the seismic events are the main concern, followed by mass movements of different nature, such as landslides and rock falls (see Table 9).

| Hazard categories | Hazard types          | Hazard sub-type  |
|-------------------|-----------------------|--|
| Meteorological    | Extreme precipitation | Heavy rain, heavy snow, monsoon,<br>blizzard, hail                   |
|                   | Storm surges          | Convective storms, (Thunderstorm, rainstorm)                         |
| Geophysical       | Mass movements        | Landslide, avalanche, rockfall,<br>subsidence                        |
|                   | Tectonic activity     | Earthquakes, earthquake-induced landslides, rockfalls and subsidence |

Table 9. Hazard categories, types and sub-types identified for Camerino based on the city Risk Profile Table; in italics earthquake-induces hazard sub-types, not included in the C40 "City Climate Hazard Taxonomy".

<sup>&</sup>lt;sup>20</sup> https://www.c40.org/researches/city-climate-hazard-taxonomy

Mass movements can also be induced by tectonic activity (as also observed in Camerino after the 2016-2017, Central-Italy seismic sequence) therefore hazard sub-types such as earthquake-induced landslides, rockfalls and subsidence have been included in Table 9.

#### 6.3.2. Exposed elements

The elements exposed to the hazards and identified in the Risk Profile Table (part 6.2 above) for Camerino have been reorganised in Table 10 below.

| Exposed Element Categories | Exposed Element Types  |
|----------------------------|--|
|                            | Ecosystem  |
| Natural Environment        | Agricultural soil  |
|                            | Natural parks and public green areas   |
|                            | Private and public buildings   |
| Built Environment          | Transportation system  |
|                            | Further critical infrastructure systems (electrical, gas, and waterworks networks etc.). |
| Cultural Heritage          | Tangible and intangible elements (see Table 11)  |
|                            | Tertiary sector (education and university)   |
| Services                   | Agriculture  |
|                            | Commerce   |
|                            | Tourism  |
| Human and Social Aspects   | External people (e.g. tourists)  |
|                            | Local people   |

 Table 10. Exposed elements identified in Camerino.

The cultural heritage category subsumes all exposed elements (Table 10) that are in themselves heritage, i.e. exposed elements declared as heritage are only categories as such

and not as any of the other categories. Table 11 reports the exposed elements categorised as cultural heritage. Here, reference has been made to the six categories identified by the *Climate Change and Cultural Heritage Working Group* (CCHWG) in 2019. Thanks to data provided by the *Italian Ministry of Cultural Heritage, Cultural Activities and Tourism* (MIBACT), cultural heritage assets were identified in Camerino for all the six typologies identified by CCHWG<sup>21</sup>, as reported in Table 12. However, among the six CCHWG categories the following three are of particular relevance for Camerino: Movable Heritage, Building and Structures, and Cultural Landscapes. For the aforementioned cultural heritage, categories cultural heritage sub-types have been identified to provide a more detailed picture (Table 11).

| Exposed Cultural Heritage  | Exposed Cultural Heritage                              |
|----------------------------|--|
| Categories                 | Types  |
| Moveable Heritage          | Works of monumental sculpture and painting             |
| Archaeological Resources   | Archaeological sites                                   |
|                            | Archaeological monuments                               |
|                            | Architecture: churches, castles, palaces, towers, etc. |
| Buildings and Structures   | Groups of separate or connected buildings              |
|                            | Historical nuclei in surrounding villages              |
| Cultural Landscapes        | Parks/gardens  |
| Associated and Traditional | Local authorities for the management of the            |
| Communities                | mountain areas and congregations                       |
|                            | Oral traditions  |
|                            | Performing arts  |
| Intangible Heritage        | social practices                                       |
|                            | Rituals  |
|                            | Festive events   |
|                            | Knowledge and skills to produce traditional crafts     |

Table 11. Categories and types of the cultural heritage exposed elements identified in Camerino.

<sup>&</sup>lt;sup>21</sup> https://adobeindd.com/view/publications/a9a551e3-3b23-4127-99fd-a7a80d91a29e/g18m/publication-web-resources/pdf/CCHWG\_final\_print.pdf

As far as **Movable Heritage** is concerned, there is a strong interest in Camerino to find viable operational procedures and location (depots) to ensure the preservation and security of the works of monumental sculpture and paintings that were dislocated from the damaged churches and palaces in Camerino following the recent seismic events.

As for **Buildings and Structures**, the interest is both in groups of separate or connected buildings as well as in historical nuclei. For groups of separate buildings, the following subcategories have so far been identified in Camerino: churches, castles, palaces, triumphal arches, masonry bridges, towers and obelisks. For connected buildings, as far as seismic hazard is concerned, a peculiar analysis (from a strictly technical point of view) needs to be performed. These "building aggregates" are very typical in Italian historical centers. With regard to historical nuclei, in addition to Camerino, small surrounding villages (e.g. Ussita and Visso) will also be investigated.

As concerns **Cultural Landscape**, attention will be placed on natural capital (parks and gardens and on any heritage green and blue infrastructure included there) that go beyond Camerino's administrative borders and that are governed, as far as their preservation is concerned, by local authorities for the management of the mountain areas.

#### 6.3.3. Impacts

Table 13 reports the different impacts identified in Camerino for the five categories of impacts included in the Risk Profile Table (part 6.2 above) for the different exposed elements categorised according to the classification reported in Table 11 reports in a succinct way.

| Exposed<br>Element<br>Categories | Exposed<br>Element<br>Types                | Physical   | Functional | Societal                                       | Economic                          | Intangible |
|----------------------------------|--|--|------------|--|-----------------------------------|------------|
| Natural<br>Environment           | Ecosystem                                  | Damage to ecosystems                                   |            |  | Loss of<br>tourism<br>revenue     |            |
|                                  | Natural parks<br>and public<br>green areas | Degradation<br>and damage<br>to natural<br>environment |            |  | due to<br>decrease<br>in visitors |            |
|                                  | Agricultural<br>soil                       | Damage to<br>old trees                                 |            |  |                                   |            |
|                                  | Private and<br>public<br>buildings         | Damage   |            | Loss of<br>access to<br>residential<br>houses, |                                   |            |
|                                  | Transportation system                      | Damage   |            | offices,<br>schools                            |                                   |            |

| Exposed<br>Element<br>Categories | Exposed<br>Element<br>Types            | Physical                         | Functional            | Societal                       | Economic                      | Intangible  |
|----------------------------------|--|----------------------------------|-----------------------|--------------------------------|-------------------------------|---|
| Built<br>environment             | Critical<br>infrastructure<br>systems  | Damage of<br>sewerage<br>systems |                       | and key<br>services            |                               |   |
| Cultural<br>Heritage             | Tangible and intangible elements       | Damage                           | Service<br>disruption |                                | Loss of<br>tourism<br>revenue | Loss of<br>cultural<br>values and<br>traditions                   |
|                                  | Tertiary<br>(education,<br>university) |                                  |                       |                                |                               |   |
| Services                         | Agriculture                            |                                  |                       |                                |                               |   |
|                                  | Commerce                               |                                  |                       |                                | Loss of revenue               |   |
|                                  | Tourism                                |                                  |                       |                                |                               |   |
| Human and<br>Social<br>Aspect    | External<br>people (e.g.<br>tourists)  |                                  |                       |                                |                               |   |
|                                  | Local people                           | Injury and death                 |                       | Loss of<br>personal<br>effects |                               | Possible<br>effects on<br>mental<br>health,<br>PTSD <sup>22</sup> |

Table 12. Physical, Functional, Societal, Economic and Intangible impacts identified for the different exposed elements in Camerino.

Further to the impacts identified by Camerino in the Risk Profile Table (part 6.2 above), it is suggested to consider additional impacts. In particular, and as far as societal impacts are concerned, it would be important to consider all the people directly and indirectly affected by a disaster (e.g. people whose livelihoods and/or family and traditional craft businesses were

<sup>&</sup>lt;sup>22</sup> \*Post-traumatic stress disorder (PTSD), e.g. in Camerino due to the experienced trauma, lifestyle modifications, lack of reference points including loss of access to houses, personal effects and religious and cultural heritage buildings.

disrupted or destroyed) as well as long-term effects (e.g. the sudden post-disaster increase in depopulation of the territory already in act since a long time in all the rural territories of central Italy). Furthermore, Camerino's Risk Profile Table currently encompasses only indirect economic losses (i.e. loss of revenue), whereas direct economic losses should also be accounted for (e.g. direct economic losses resulting from damaged or destroyed buildings, cultural heritage and critical infrastructures). Additionally, as far as loss of revenue is concerned, it would be important to further disaggregate them by economic sector, according to the standard classification adopted in Italy (ATECO 2007<sup>23</sup>).

#### 6.3.4. Outlook and implications for the ARCH project

Based on the information provided in the Risk Profile Table (part 6.2 above) and building on the joint meetings between Camerino and the research partners, ARCH's work for the municipality of Camerino is envisaged to be conducted at different levels of analysis (Table 13).

| Study Areas/Buildings   | Possible Analysis  | Possible Tools  |
|---|--|---|
| District scale - beyond the municipality's borders                      | <ul><li>Impact chain analysis;</li><li>Thematic maps.</li></ul>                            | <ul> <li>IVAVIA impact chain creator (adapted for ARCH);</li> <li>ARCH DSS (i.e. CIPCast).</li> </ul>   |
| Municipality scale - Camerino's<br>old town                             | Scenario simulations   | <ul> <li>ARCH DSS;</li> <li>Satellite images and and/or survey supported by drones.</li> </ul>  |
| Prototypical building scale -<br>identified within Camerino old<br>town | Scenario simulations with<br>dynamic data integration from<br>sensors and satellite images | <ul> <li>ARCH DSS;</li> <li>Survey supported by drones;</li> <li>Chemical and mechanical characterisation of constructive materials;</li> </ul> |

<sup>&</sup>lt;sup>23</sup> ATECO 2007 classification is the Italian national version of the Nace Rev. 2 (the statistical classification of economic activities in the European community, https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF). From 2008, not only the Italian National Institute of Statistics (ISTAT) adopted the so called ATECO 2007, but also multiple institutional governance body (e.g. the Ministry of Economy, business enterprise associations, and internal revenue agencies).

| Study Areas/Buildings  | Possible Analysis   | Possible Tools   |
|--|---|--|
|  |   | Sensors.   |
| Two buildings of interest (See<br>Section 2):<br>1) Palazzo Ducale;<br>2) Santa Maria in Via Church. | <ul> <li>3D building model with identified damage pattern;</li> <li>Dynamic monitoring of damage;</li> <li>Finite element analysis of the buildings to support retrofitting interventions.</li> </ul> | <ul> <li>Sensors installation of<br/>low-cost and traditional<br/>structural health<br/>monitoring sensors<br/>(e.g. MEMS, optic fibre<br/>and accelerometers);</li> <li>Chemical and<br/>mechanical<br/>characterisation of<br/>constructive materials;</li> <li>Photogrammetry laser<br/>scanner and/or survey<br/>supported by drones;</li> <li>3D models.</li> </ul> |

Table 13. Possible analysis and possible tools to be implemented for ARCH work in Camerino.

Table 13 provides initial ideas of possible examples for the work that can be undertaken as part of the ARCH project. The proposed content in Table 13 was discussed with the municipality of Camerino and the research partners.

For the different study areas/buildings, identified in Table 13, the idea is to conduct damage and impact assessments, with particular focus on seismic events and heavy snow falls, both at the "status quo" and after the implementation of resilience strategies that might encompass both physical interventions (such as seismic retrofitting of buildings, critical infrastructure and cultural heritage), as well as strategies to improve the current best practices and frameworks for governance and management.

The idea is to allow the municipality to assess the effectiveness of alternative resilience strategies not only in terms of tangible and measurable costs and benefits (e.g. reduction of physical damage to the built environment, including cultural heritage asset, reduction of physical and social impacts on communities, depopulation of the territory, direct and indirect economic losses), but also in terms of reduction of intangible losses related to the loss of cultural and artistic value and to the loss of social practices such as festive events and the know-how for producing traditional crafts.

### 7. Preliminary resilience assessment

The following resilience assessment was developed using the preliminary version of the *UNDRR Disaster Resilience Scorecard for Cities*. The preliminary assessment was conducted within the framework of a workshop between the municipality of Camerino, the University of Camerino, ENEA, and Fraunhofer on 9<sup>th</sup> December 2019. As the original Scorecard is aimed at city-level, not all questions were immediately applicable on the level of historic areas or single heritage assets. Wherever possible, answers were provided for the historic areas under examination (e.g. with regard to hazard scenarios). For all other questions, answers were provided on city-level (e.g. with regard to city masterplans). The results give a first indication of the overall resilience of the city with some – but not exclusive – focus on the historic areas examined by ARCH. In addition, the application of the Scorecard will be used as input for the development of the ARCH Resilience Assessment Framework specifically focused on historic areas. Lastly, the preliminary resilience assessment results presented in the baseline reports should not be employed to develop resilience action plans, as not all necessary stakeholder groups were involved in the assessment process.

#### 7.1. Essential 01: Organise for resilience



| P1.1 | Does the city master plan (or relevant strategy/plan) adopt the Sendai Framework?   | 0 |
|------|---|---|
| P1.2 | Is there a multi-agency/sectoral mechanism with<br>appropriate authority and resources to address<br>disaster risk reduction? | 3 |
| P1.3 | Is resilience properly integrated with other key city functions / portfolios?   | 1 |

#### Figure 26. Results Essential 01.

For Essential 01, Camerino achieves an overall resilience score of 4/9, with room for improvements in planning and resilience integration. There exists no city master plan in order to improve resilience, and the *Sendai Framework for Disaster Risk Reduction* is not well known in Camerino (score of 0 for P1.1). Urban planning takes into account the geomorphological features of the municipal area. Camerino's municipality has a preliminary civil emergency plan that roughly defines the general tasks of officials in case of emergency events, and the main reception areas for people. The Civil Protection Office of the Camerino municipality (COC) is the first authority that organizes disaster and emergency response, before the successive and possible interventions of the regional and national civil protection offices. At the same time, the local, regional, and national offices for civil protection are well coordinated and resourced, enabling a multi-agency mechanism for addressing disaster risk reduction to be applied (score of 3 for P1.2). Lastly, disaster resilience is only integrated with key city functions (e.g. planning or community engagement) on an ad hoc basis (score of 1 for P1.3).



## 7.2. Essential 02: Identify, understand and use current and future risk scenarios

For Essential 02, Camerino achieves an overall resilience score of 8/15. The municipality understands the main hazards affecting it and there are currently some processes for updating information concerning seismic and landslide hazard maps. Geomorphological features of the municipal area are taken into account in the urban planning choices (land use zoning plan). There are no risk scenarios for the main natural hazards, however some issues are roughly defined in the civil emergency plan (score of 2 for P2.1). At the same time, individual system risks are not shared among utility providers and regional/ national agencies proactively in order to understand cascading effects; these risks are only shared after a hazard occurred as part of post-disaster discussions (score of 1 in P2.2). Specifically, the regional institutions have historical data on the main seismic sequences, but not enough data for other hazard scenarios (score of 1 for P2.3). As a result from P2.2 and P2.3, there is only a limited understanding of cascading impacts under a limited amount of disaster scenarios (score of 1 for P2.4). However, for most hazards (i.e. seismic and hydrogeological risks) there exist regularly updated hazard maps provided by national agencies (score of 3 for P2.5).

#### 7.3. Essential 03: Strengthen financial capacity for resilience

For Essential 03, Camerino achieves an overall resilience score of 5/12. While the municipality employs crowdfunding and participates in national/European (research) projects, not enough information about other funding opportunities is available (score of 1 for P3.1).

At the same time, the municipality's financial plan allows for DRR activities and the associated budgets are reserved (score of 2 for P3.2). An area where room for improvement exists is insurance coverage, which varies significantly per sector and is not actively promoted by the municipality (score of 1 for P3.4). Whereas public infrastructure is often covered by insurance, cultural heritage assets are not. Lastly, there exists a sufficient number of incentives to support resilience building on national and regional level, with gaps remaining in some sectors (score of 2 for P3.4).



Figure 28. Results Essential 03.

#### 7.4. Essential 04: Pursue resilient urban development



| P4.1 | Is the city appropriately zoned considering, for<br>example, the impact from key risk scenarios on<br>economic activity, agricultural production, and<br>population centres? | 2 |
|------|--|---|
| P4.2 | Are approaches promoted through the design<br>and development of new urban development to<br>promote resilience?   | 2 |
| P4.3 | Do building codes or standards exist, and do<br>they address specific known hazards and risks<br>for the city? Are these standards regularly<br>updated?                     | 1 |
| P4.4 | Are zoning rules, building codes and standards widely applied, properly enforced and verified?   | 3 |
|      |  |   |

Figure 29. Results Essential 04.

For Essential 04 Camerino achieves a resilience score of 8/12 with minor room for improvement. The municipality employs a land use zoning plan loosely based on known hazards and risks (score of 2 for P4.1) and promotes resilience in new urban developments (guidance for this can be improved) (score of 2 for P4.2). Regulations exist on national level and have to be implemented on local level but in general there is no clear planning for updating the codes (score of 1 for P4.3). Most importantly, where zoning plans and building codes are available these are enforced, although not always verified (score of 3 in P4.4).

## 7.5. Essential 05: Safeguard natural buffers to enhance the protective functions offered by natural ecosystems



| P5.1 | Beyond just an awareness of the natural assets,<br>does the city understand the functions (or<br>services) that this natural capital provides for the<br>city?   | 3 |
|------|--|---|
| P5.2 | Is green and blue infrastructure being promoted<br>on major urban development and infrastructure<br>projects through policy?   | 3 |
| P5.3 | Is the city aware of ecosystem services being<br>provided to the city from natural capital beyond its<br>administrative borders? Are agreements in place<br>with neighbouring administrations to support the<br>protection and management of these assets? | 2 |

Figure 30. Results Essential 05.

For Essential 05, Camerino achieves a high resilience score of 8/9. Both the municipality and key stakeholders are familiar with the term ecosystem services and understand the economic value of all the functions provided by key local natural assets (score of 3 for P5.1).

In addition, green and blue infrastructure is being promoted in major urban development and infrastructure projects through policy and supporting guidance material (score of 3 for P5.2). Lastly, the municipality is aware of the importance of the functions provided by natural capital beyond its administrative borders and there has been some exchange with neighbouring administrators (score of 2 for P5.3). As an example, the municipality is part of an association of mountain communities<sup>24</sup> sharing ecosystem services.

In the Marche Region there are eight local authorities for the management of the mountain areas (see Section 7.3); these are local institutions made up of some municipalities which share financial funds in order to guarantee the essential social and economic services to the population and in order to manage the land use zoning and planning, and to preserve landscapes and ecosystems.

#### 7.6. Essential 06: Strengthen institutional capacity for resilience

For Essential 06 Camerino achieves a resilience score of 5/18 with significant room for improvement. While the municipality can access most of the skills and resources necessary to respond to potential disaster scenarios, gaps still exist. This is especially the case for predisaster planning as well as coordination with utility providers (score of 1 for P6.1). Through the dissemination activities of schools and the local university on hazards and risks as well as through civil protection meetings, the municipality is able to reach more than 50% of its

<sup>&</sup>lt;sup>24</sup> The local authorities for the management of the mountain areas were established by D.Lgs 267/2000 and L.R. 35/2013 with the aim of supporting and maintaining partnerships between single local municipalities into a wider governance of internal territories, focused on the protection, conservation and the enhancement of the natural environment. The local authorities for the management of the mountain areas are local entities set up for the enhancement and development of mountain areas and for associated functions and services between municipalities. The municipality of Camerino is part of the "Unione Montana Marca di Camerino" with other neighboring municipalities. The "Unione Montana Marca di Camerino" provides a support to plan and develop green and blue infrastructures, forest management, etc. on and beyond the territory of Camerino.

population with targeted education and awareness raising campaigns (score of 2 for P6.2). However, only some of the municipality's data layers about hazards and risks are shared with other organisations, and the information that is shared requires further interpretation due to the raw format of the data (score of 1 for P6.3).



While schools and the university disseminate hazard information, there exist no training courses covering risks and resilience issues on the local level, only some civil protection courses on national level exists (score of 0 for P6.4).

Similarly, as no training material exists, it is not translated into other languages. However, if training material would exist, it would be provided in Italian, which is the majority language in Camerino (score of 0 for P6.5). Lastly, knowledge exchange with other municipalities facing similar challenges is limited to local networks and via participation in (research) projects.

As such, the exchange is more ad hoc than systematic (score of 1 for P6.6). Improving resilience is principally dependent on the availability of financial funds which may be limited for a small town such as Camerino.

## 7.7. Essential 07: Understand and strengthen societal capacity for resilience

For Essential 07, Camerino achieves a resilience score of 10/12. The municipality actively engages community organizations (e.g. the Concentrico committee – a committee of private citizens) in risk reduction actions and pre-event planning (score of 3 for P7.1).

However, vulnerable population groups do not receive any specific disaster training (score of 1 for P7.2). Of the few businesses in Camerino that employ more than 10 employees – which

are not very many – all have a business continuity plan (score of 3 for P7.3). Lastly, multiple multimedia channels are used for communicating with citizens (score of 3 for P7.4).



Figure 32. Results Essential 07.

#### 7.8. Essential 08: Increase infrastructure resilience

For Essential 08, Camerino achieves a resilience score of 16/27. There are no plans or forums to tackle critical infrastructure resilience, as critical infrastructure providers manage these risks on their own (score of 0 for P8.1). For some hazards, such as seismic events and landslides, studies are carried out by the civil protection department or by the Marche Region in order to highlight possible critical issues.



Figure 33. Results Essential 08.

However, the healthcare and education systems of Camerino are well suited to deal with the hazards faced by the municipality as more than 90% of major injuries could be treated within six hours under the "most severe" scenario (score of 3 for P8.7), and no teaching facilities would be at risk under the "most probable" scenario (score of 2 for

| P8.1 | Is critical infrastructure resilience a city priority,<br>does the city own and implement a critical<br>infrastructure plan or strategy?  | 0 |
|------|---|---|
| P8.2 | Is existing protective infrastructure well-designed and well-built based on risk information?   | 1 |
| P8.3 | Would a significant loss of service for these two<br>essential services be expected for a significant<br>proportion of the city under the agreed disaster<br>scenarios?   | 1 |
| P8.4 | Would a significant loss of service be expected<br>for a significant proportion of the city in the 'worst<br>case' scenario event? In the event of failure<br>would energy infrastructure corridors remain safe<br>(i.e. free from risk of leaks, electrocution hazards<br>etc.)? | 2 |
| P8.5 | Would a significant loss of service be expected<br>for a significant proportion of the city in the 'worst<br>case' scenario event? In the event of failure<br>would transport infrastructure corridors remain<br>safe (i.e. free from risk of flood, shocks etc) and<br>passable? | 2 |
| P8.6 | Would a significant loss of service be expected<br>for a significant proportion of the city in the 'worst<br>case' scenario event?  | 2 |
| P8.7 | Would there be sufficient acute healthcare capabilities to deal with expected major injuries in 'worst case' scenario?  | 3 |
| P8.8 | % of education structures at risk of damage from<br>"most probable" and "most severe" scenarios   | 2 |
| P8.9 | Will there be sufficient first responder equipment, with military or civilian back up as required?  | 3 |
|      |   |   |

P8.8). Lastly, first responders in Camerino are well equipped to deal with the "most severe" scenario (score of 3 for P8.9). While there is protective infrastructure in place for landslides that are well maintained and monitored, protective infrastructure for other hazards is missing and the design of existing infrastructure may not be consistent with best practices (score of 1 for P8.2). As for loss of service, there would be some loss of services under the "most severe" scenario (i.e. a seismic events of similar intensity as the ones in 2016) for the energy, transport, and communications systems (scores of 2 for P8.4, P8.5, and P8.6), while some loss of service would be expected for the water system even under the "most probable" scenario (i.e. heavy snowfalls; score of 1 for P8.3).

#### 7.9. Essential 09: Ensure effective disaster response

For Essential 09, Camerino achieves a resilience score of 14/21. The early warning systems can reach more than 75% of the population; however 30% of the population is not reachable, e.g. due to no possession of mobile phone such as is the case for the elderly (score of 2 for P9.1). In addition, Camerino's municipality has a preliminary civil emergency plan that roughly defines the general tasks of the officials for emergency events and the main reception areas for people (score of 1 for P9.2).





The responsible disaster management authority has enough staff and is able to cover all the neighbourhoods within 24-48 hours in case of an emergency

| P9.1 | Does the city have a plan or standard operating<br>procedure to act on early warnings and<br>forecasts? What proportion of the population is<br>reachable by early warning system?                                  | 2 |
|------|---|---|
| P9.2 | Is there a disaster management / preparedness /<br>emergency response plan outlining city<br>mitigation, preparedness and response to local<br>emergencies?   | 1 |
| P9.3 | Does the responsible disaster management<br>authority have sufficient staffing capacity to<br>support first responder duties in surge event<br>scenario?  | 2 |
| P9.4 | Are equipment and supply needs, as well as the availability of equipment, clearly defined?  | 3 |
| P9.5 | Would the city be able to continue to feed and shelter its population post-event?   | 3 |
| P9.6 | Is there an emergency operations centre, with<br>participation from all agencies, automating<br>standard operating procedures specifically<br>designed to deal with "most probable" and "most<br>severe" scenarios? | 0 |
| P9.7 | Do practices and drills involve both the public and professionals?  | 2 |

scenario (score of 2 for P9.3). In addition, the equipment and relief supply needs are defined at national level (score of 3 for P9.4) and the necessary supplies of food and basic relief items exceeds estimated needs in the "most severe" scenario (score of 3 for P9.5).

The local civil protection office of Camerino (C.O.C.) is the first authority to organize disaster and emergency response before the successive and possible interventions of the regional and national civil protection departments (score of 3 for P9.6). Lastly, schools, the university and public offices conduct annual drills for disaster response, which are validated by professionals, but are not based on the "most severe" or "most probable" scenario (score of 2 for P9.7).



#### 7.10. Essential 10: Expedite recovery and build back better



#### Figure 35. Results Essential 10.

For Essential 10, Camerino achieves a resilience score of 3/6., The current plans for postevent recovery and rebuilding may be improved, especially in terms of economic reboot (score of 1 for P10.1).

The commissioner responsible for rebuilding of the real estate damaged by the last seismic sequence (2016) issues several ordinances that define criteria for the repair and financing of different types of buildings and of cultural. In terms of lessons learnt, there are clear processes in place to capture lessons from previous difficulties for coping post-event, but the mechanism to transfer these lessons into the design and delivery of rebuilding projects needs improvement. Methods, procedures and funds, which are updated and renewed for each new disaster event, do not always allow for addressing the best and more resilient solutions. (score of 2 for P10.2).

A general issue is the need to combine the preservation of the construction and cultural features of the old town area with the retrofitting works in order to ensure a suitable safety level for the population. Furthermore, there are social and economic issues that have to be tackled in order to avoid the depopulation of the old town.



#### 7.11. Overall resilience of Camerino

Figure 36. Combined results of Essentials 1 to 10 for Camerino.

Overall, Camerino achieves a resilience score of 81/141.

The highest scores for resilience were achieved for Essentials 02, 04, 05, 07 and 08 and 09. Camerino offers well established warning systems as well as organisations for risk reduction within the population. The city is a member of a local authority for the management of the mountain areas and it gives great value to its surrounding natural ecosystem and its protection. A zoning plan for hazardous areas and building codes for urban development exists. The incorporation of these in the development plan of the city will be improved in the next years.

Most room for improvement of the resilience was found in Essential 01, 03, 06, and 10.

High quality maps and information about hazards, in particular about seismic and geomorphological hazards, are available, but the sharing of these information may be improved and these data are not currently implemented in order to carry out future risk scenarios. The local and regional civil protection offices have defined procedures for postdisaster management. The lack of detailed risk scenarios for emergencies does not currently allow for the development of suitable pre-disaster planning. The critical infrastructure providers do not have a specific agreement with the municipality for resilience improvement, but they support the municipality when disasters occur.

Furthermore, there are minor deficits in the Essentials 01, 03, 10. The Municipality of Camerino employs a general land use zoning plan and it has a civil protection plan for population reception and rebuilding after seismic events. Risk scenarios are not available for the main natural hazards, and thus there is no plan for improving resilience. However, regional and national civil protection services do function well. In contrast to the well-insured public infrastructure, there is no dedicated financial support for resilience and investment actions, different form the ordinary maintenance, for heritage sites. The municipality of Camerino, when disasters occur, establishes a local civil protection office. The emergency warning service and support systems offer sufficient functions. Up to now, there are some difficulties in order to learn from previous events due to financial and social reasons and the need to preserve the original construction features of the old town. For new buildings built in the peripheral areas, after the last seismic events, innovative construction techniques are used such as base-isolated buildings.

## 8. Conclusion

The preliminary analysis of the main hazards, exposed elements and the possible impacts in section 6 allows an initial assessment of the resilience of different features of the municipality of Camerino. This resulted in the identification of preliminary priorities corresponding to the findings of the baseline review and useful for defining the municipality's detailed needs and objectives within the ARCH project. The main aspects for the improvement of Camerino's resilience (chapter 7) were found to be the identification and use of the risk scenarios, and the planning of institutional strategies to improve the resilience of the urban areas as well as the infrastructure.

Generally, maps and information about seismic and geomorphological hazards are available, but these are currently not utilised to define future risk scenarios. The local civil protection office has defined procedures for post-disaster management, however, pre-disaster planning is hindered by a lack of detailed risk scenarios for future emergencies. Furthermore, critical infrastructure providers currently have no specific agreement with the municipality for resilience improvement, but rather support the municipality on ad-hoc basis when disasters occur. There are also some difficulties in making use of the lessons learned from previous events due to financial and social reasons. Another challenge derives from the need to preserve the historical construction techniques as well as the cultural features of the Old Town despite the necessity for seismic retrofitting.

Based on this, the specific objectives for the ARCH Project for Camerino include:

1) to improve the predictive models and risk assessment methods to lead future actions for current post-earthquake reconstruction, mitigate the effects of future events and enhance the preparedness for natural hazards;

2) to increase the knowledge base on the geological-structural setting of the "Camerino hill" and the geomorphological processes, thereby determining the hydrogeological hazard scenarios for the historical centre;

3) to increase the knowledge of the vulnerability of historical buildings with reference to construction materials and techniques;

4) to monitor cultural heritage of significant value in order to provide alerts and real-time information about damage resultant from natural hazards and degradation due to environmental conditions;

5) to develop guidelines for managing and securing artefacts and artwork after seismic events.

It is therefore planned to conduct the analyses of the risks due to natural hazards at different urban scales; from the district scale to that of the case study buildings (the Ducal Palace and Santa Maria in Via's Church). Furthermore, extreme precipitation can influence the risk scenario concerning landslides and service networks (communication, electric, etc.). Thus, enacting measures for increasing urban resilience leads to disaster risk reduction.

These strategies can be supported by the assessment of tangible costs and benefits (e.g. reduction of physical damage to the built environment, direct and indirect economic losses),

and intangible losses related to the loss of cultural and artistic value. The planned activities will also allow the definition of risk scenarios via the use of tools [32] that are able to support the planning of resilience improvement and the identification of emergency strategies for the urban area.

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Additional key documents and laws are described in the Annex (part 11).

## 10. List of abbreviations

| Term    | Meaning   |
|---------|---|
| CAPI    | Emergency Service Centre  |
| CCS     | Coordination Centre   |
| CCHWG   | Climate Change and Cultural Heritage Working Group                                |
| CMCC    | Euro Mediterranean Centre on Climate Change                                       |
| CNSAS   | National Mountain Rescue and Speleological Corps                                  |
| COAU    | Joint Air Operations Centre   |
| СОЕММ   | Operations Centre for Maritime Emergencies  |
| СОМ     | European Commission documents   |
| DG ECHO | Directorate-General for European Civil Protection and Humanitarian Aid Operations |
| DSS     | Decision support system   |
| ECCR    | Emergency Response Coordination Centre  |
| ETS     | European Treaty Series  |
| ICOMOS  | International Council on Monuments and Sites                                      |
| IMELS   | Italian Ministry for the. Environment, Land and Sea                               |
| INGV    | National Institute of Geophysics and Volcanology                                  |
| INSPIRE | Infrastructure for Spatial Information in Europe                                  |

| IVAVIA | Impact and Vulnerability Analysis of Vital Infrastructures and Built-up Areas |
|--------|---|
| LCA    | Life Cycle Analysis   |
| MIBACT | Ministry of Cultural Heritage and Activities, and Tourism                     |
| MEMS   | Micro Electro-Mechanical Systems  |
| NAP    | Italian National Adaptation Plan for Climate Change                           |
| NAS    | National Adaptation Strategy  |
| POR    | Regional operative program  |
| PTSD   | Post-traumatic stress disorder  |
| RDP    | Rural Development Plan  |
| SOUP   | Regional Operative Office   |
| SWD    | European commission staff working document                                    |
| UNDRR  | United Nations Office for Disaster Risk Reduction                             |

## °ARCH

### 11. Annex

#### **11.1. Key documents governing cultural heritage management (see Section 3)**

| Name of<br>document  | Type of<br>document                     | Level         | Binding /<br>non-binding | Author(s)   | Year<br>published | Timeline for future<br>revision/update   | Link (if available)  | Summary of content   |
|--|---|---------------|--------------------------|---|-------------------|--|--|--|
| Convention<br>for the<br>Safeguardin<br>g of the<br>Intangible<br>Cultural<br>Heritage | Agreement                               | International | Non-binding              | United<br>Nations<br>Educational,<br>Scientific<br>and Cultural<br>Organization<br>(UNESCO) | 2003              | No relevant timelines<br>for the Convention<br>itself have been<br>identified. The created<br>list of intangible<br>heritage elements is<br>annually updated.                    | Convention:<br>https://ich.unesco.org/<br>en/convention<br>List of Intangible<br>Cultural Heritage:<br>https://ich.unesco.org/<br>en/00011?type=00002<br>#tabs | The Convention<br>established (Article 16)<br>a Representative List<br>of Intangible Cultural<br>Heritage of Humanity.   |
| European<br>Framework<br>for Action on<br>Cultural<br>Heritage                         | Commission<br>staff working<br>document | International | Non-binding              | European<br>Commission  | 2018              | Implementation of the<br>Framework will be<br>monitored by the<br>Cultural Heritage<br>Forum, an informal<br>Commission expert<br>group meeting at least<br>annually since 2019. | https://ec.europa.eu/cu<br>lture/content/european<br>-framework-action-<br>cultural-heritage_en  | Framework of<br>continued action for<br>Europe's cultural<br>heritage based on a<br>holistic, mainstreaming<br>and integrated<br>approach, multi-<br>stakeholder<br>cooperation. |

| Name of<br>document   | Type of<br>document | Level         | Binding /<br>non-binding | Author(s)            | Year<br>published | Timeline for future<br>revision/update | Link (if available)   | Summary of content   |
|---|---------------------|---------------|--------------------------|----------------------|-------------------|--|---|--|
| Convention<br>for the<br>Protection of<br>the<br>Architectural<br>Heritage of<br>Europe | Agreement           | International | Binding                  | Council of<br>Europe | 1987              |  | https://www.coe.int/en/<br>web/conventions/full-<br>list/-<br>/conventions/treaty/12<br>1 | Legally binding<br>instrument which sets<br>the framework for an<br>accurate conservation<br>approach<br>within Europe. Aims to<br>reinforce and promote<br>policies for the<br>conservation and<br>enhancement of<br>Europe's heritage. |
| European<br>Landscape<br>Convention   | Agreement           | International | Binding                  | Council of<br>Europe | 2000              |  | https://www.coe.int/en/<br>web/conventions/full-<br>list/-<br>/conventions/treaty/14<br>3 | Promotes the<br>protection,<br>management and<br>planning of the<br>landscapes and<br>organizes international<br>co-operation on<br>landscape issues.  |

| Name of<br>document  | Type of<br>document | Level         | Binding /<br>non-binding | Author(s)             | Year<br>published | Timeline for future<br>revision/update | Link (if available)   | Summary of content   |
|--|---------------------|---------------|--------------------------|-----------------------|-------------------|--|---|--|
| European<br>Convention<br>on the<br>Protection of<br>the<br>Archaeologic<br>al Heritage<br>(Revised) | Agreement           | International | Binding                  | Council of<br>Europe  | 1995              |  | https://www.coe.int/en/<br>web/conventions/full-<br>list/-<br>/conventions/treaty/14<br>3 | This revised<br>Convention updates<br>the provisions of a<br>previous Convention<br>adopted by the<br>Council of Europe in<br>1969. The new text<br>makes the<br>conservation and<br>enhancement of the<br>archaeological<br>heritage one of the<br>goals of urban and<br>regional planning<br>policies. |
| Italian law<br>no. 184, 6 <sup>th</sup><br>April 1977  | Law                 | National (I)  | Binding                  | Italian<br>Parliament | 1977              |  | https://www.gazzettauf<br>ficiale.it/   | Ratification and<br>implementation of the<br>convention on the<br>protection of the<br>world's cultural and<br>natural heritage, Paris,<br>23 <sup>th</sup> November 1972.   |

| Name of<br>document   | Type of<br>document | Level        | Binding /<br>non-binding | Author(s)             | Year<br>published | Timeline for future<br>revision/update | Link (if available)                   | Summary of content  |
|---|---------------------|--------------|--------------------------|-----------------------|-------------------|--|---------------------------------------|---|
| Italian Law<br>no. 93 of 15 <sup>th</sup><br>February<br>1989         | Law                 | National (I) | Binding                  | Italian<br>Parliament | 1989              |  | https://www.gazzettauf<br>ficiale.it/ | Ratification and<br>execution of the<br>European Convention<br>for the Protection of<br>the Architectural<br>Heritage in Europe,<br>Granada, 3 <sup>rd</sup> October<br>1985.   |
| Legislative<br>Decree no.<br>42, 22 <sup>nd</sup><br>January,<br>2004 | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2004              |  | https://www.gazzettauf<br>ficiale.it/ | Legislative Decree no.<br>42, 22/01/2004<br>(Cultural Heritage and<br>Landscape Code). The<br>Legislative Decree<br>describes the<br>standards for the<br>cultural heritage i.e.<br>architectural heritage,<br>museums, artwork.<br>Furthermore, this code<br>defines the criteria for<br>the planning of<br>protection, use and the<br>enhancement of the<br>cultural heritage.<br>Standards for the<br>landscape planning<br>are shown. |

| Name of<br>document  | Type of<br>document | Level        | Binding /<br>non-binding | Author(s)             | Year<br>published | Timeline for future<br>revision/update | Link (if available)   | Summary of content   |
|--|---------------------|--------------|--------------------------|-----------------------|-------------------|--|---|--|
| Legislative<br>Decree no.<br>62, 26 <sup>th</sup><br>March, 2006 | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2006              |  | https://www.gazzettauf<br>ficiale.it/   | Legislative Decree no.<br>62, 26/03/2006<br>(changes on<br>Legislative decree n.<br>42/2004).  |
| Legislative<br>Decree no.<br>63, 26 <sup>th</sup><br>March, 2006 | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2006              |  | https://www.gazzettauf<br>ficiale.it/   | Legislative Decree no.<br>63, 26/03/2006<br>(changes on<br>Legislative Decree n.<br>42/2004).  |
| Marche<br>Region Law<br>no. 04,<br>09/02/2010                    | Law                 | Regional     | Binding                  | Regional<br>Council   | 2010              |  | https://www.consiglio.<br>marche.it/banche_dati<br>_e_documentazione/le<br>ggi/ | Regional law no. 04,<br>09/02/2010, Laws on<br>cultural heritage and<br>activities. This law<br>defines the tasks of<br>the Region, of the<br>municipalities and of<br>the local authorities<br>and the types of<br>activities in order to<br>enhance both the<br>cultural heritage and<br>the landscapes. |

### **11.2.** Key documents governing disaster risk reduction (see Section 4)

| Name of<br>document                      | Type of<br>document | Level                     | Binding /<br>non-binding | Author(s)  | Year<br>published | Timeline for<br>future evaluation<br>/update)  | Link (if<br>available)   | Summary of content  |
|--|---------------------|---------------------------|--------------------------|--|-------------------|--|--|---|
| Sendai<br>Framework                      | Agreement           | International             | Non-binding              | United<br>Nations<br>Office for<br>Disaster Risk<br>Reduction<br>(UNDRR) | 2015              | Valid until 2030.<br>UNDRR is in<br>charge of follow-<br>up and review of<br>the Sendai<br>Framework by<br>preparing periodic<br>reviews on<br>progress, among<br>other actions. | http://www.unis<br>dr.org/we/inform<br>/publications/43<br>291 | Establishment of a global<br>framework for action to<br>prevent new and reduce<br>existing disaster risks, based<br>on 7 targets, 4 priorities for<br>action with supporting<br>rationale and 13 guiding<br>principles.   |
| EU law<br>(Decision<br>1313/2013/E<br>U) | Law                 | International<br>(Europe) | Binding                  | European<br>Parliament   | 2013              |  | https://eur-<br>lex.europa.eu/h<br>omepage.html                | Decision No 1313/2013/EU<br>of the European Parliament<br>and of the Council on a<br>Union Civil Protection<br>Mechanism. It defines the<br>activities to assist with the<br>response to immediate<br>adverse consequences of a<br>disaster inside or outside the<br>Union. |

| Name of<br>document                     | Type of<br>document | Level                     | Binding /<br>non-binding | Author(s)  | Year<br>published | Timeline for<br>future evaluation<br>/update) | Link (if<br>available)   | Summary of content   |
|---|---------------------|---------------------------|--------------------------|--|-------------------|---|--|--|
| EU law<br>(Decision<br>420/2019/EU<br>) | Law                 | International<br>(Europe) | Binding                  | European<br>Parliament   | 2019              |   | https://eur-<br>lex.europa.eu/h<br>omepage.html  | This decision defines an effective and coherent approach to the prevention of and preparedness for disasters and to promote the exchange of best practices within the Union Mechanism.   |
| Directive<br>2007/60/EU                 | Guideline           | International             | Binding                  | The<br>European<br>Parliament<br>and The<br>Council of<br>The<br>European<br>Union | 2007              |   | https://eur-<br>lex.europa.eu/le<br>gal-<br>content/EN/TXT<br>/?uri=celex:320<br>07L0060 | The purpose of this Directive<br>is to establish a framework<br>for the assessment and<br>management of flood risks,<br>aiming at the reduction of<br>the adverse consequences<br>for human health, the<br>environment, cultural<br>heritage and economic<br>activity associated with<br>floods in the Community. It<br>should be read together with<br>Act no. 7/2010 Coll. on flood<br>protection, |
| Name of<br>document  | Type of<br>document | Level        | Binding /<br>non-binding | Author(s)             | Year<br>published | Timeline for<br>future evaluation<br>/update) | Link (if<br>available)                | Summary of content   |
|--|---------------------|--------------|--------------------------|-----------------------|-------------------|---|---------------------------------------|--|
| Italian law.<br>Legislative<br>Decree no. 1,<br>02/01/2018)          | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2018              |   | https://www.nor<br>mattiva.it/        | Legislative Decree no.1<br>02/01/2018: Civil Protection<br>Code (in Italian). This law<br>defines the organisation of<br>the National Civil Protection<br>office and the tasks of the<br>offices at regional and local<br>levels. Furthermore, it<br>defines the tasks of the<br>scientific committee and the<br>planning of the activities to<br>prevent disasters and to<br>manage the rebuilding. |
| Italian law<br>(Decree of<br>the Prime<br>Minister of<br>09/08/2016) | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2016              |   | https://www.gaz<br>zettaufficiale.it/ | Decree of the Prime Minister<br>D.P.C.M. 09/08/2016: this<br>decree describes the<br>organization of the Civil<br>Protection Office (in Italian).  |

| Name of<br>document   | Type of<br>document | Level        | Binding /<br>non-binding | Author(s)             | Year<br>published | Timeline for<br>future evaluation<br>/update) | Link (if<br>available)                     | Summary of content  |
|---|---------------------|--------------|--------------------------|-----------------------|-------------------|---|--|---|
| Italian law<br>(Decree of<br>the General<br>Secretary of<br>the<br>Presidency of<br>the Council<br>of Ministers,<br>10/08/2016) | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2016              |   | http://www.prot<br>ezionecivile.gov<br>.it | Decree of the General<br>Secretary of the Presidency<br>of the Council of Ministers<br>10/08/2016: this Decree<br>describes some activities<br>concerning the Civil<br>Protection Office (in Italian) |
| Italian law<br>(Decree of<br>the Prime<br>Minister of<br>20/02/2012)  | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2012              |   | https://www.gaz<br>zettaufficiale.it/      | Decree of the Prime Minister<br>D.P.C.M. 20/02/2012: this<br>Decree describes both the<br>components and the tasks of<br>the committee that supports<br>the civil protection office (in<br>Italian)   |
| Italian law<br>(Decree of<br>the Prime<br>Minister of<br>21/11/2006)  | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2006              |   | https://www.gaz<br>zettaufficiale.it/      | Decree of the Prime Minister<br>D.P.C.M. 21/11/2006: this<br>Decree shows the activities<br>and the tasks of the Civil<br>Protection Operational<br>Committee (in Italian)                            |

| Name of<br>document                           | Type of<br>document | Level        | Binding /<br>non-binding | Author(s)             | Year<br>published | Timeline for<br>future evaluation<br>/update) | Link (if<br>available)  | Summary of content  |
|---|---------------------|--------------|--------------------------|-----------------------|-------------------|---|---|---|
| Italian law<br>no. 286,<br>27/12/2002         | Law                 | National (I) | Binding                  | Italian<br>Parliament | 2002              |   | https://www.nor<br>mattiva.it/  | Law no. 286 27/12/2002,<br>modification of the<br>Legislative Decree no. 245<br>04/11/2002, concerning<br>urgent interventions in<br>favour of populations<br>affected by natural disasters<br>in the Molise and Sicily<br>regions, as well as further<br>provisions on civil protection<br>(in Italian). |
| Marche<br>Region Law<br>no. 32,<br>11/12/2001 | Law                 | Regional     | Binding                  | Regional<br>Council   | 2001              |   | https://www.con<br>siglio.marche.it/<br>banche_dati_e_<br>documentazion<br>e/leggi/ | Regional Law no.<br>32,11/12/2001, B.U.R. n.<br>146 del 20/12/2001, (in<br>Italian). This law defines the<br>tasks of the civil protection<br>offices at regional levels and<br>the organisation of the civil<br>protection authorities.  |
| Marche<br>Region Law<br>no. 13,<br>03/04/2015 | Law                 | Regional     | Binding                  | Regional<br>Council   | 2015              |   | https://www.con<br>siglio.marche.it/<br>banche_dati_e_<br>documentazion<br>e/leggi/ | Regional Law no. 13,<br>03/04/2015, B.U.R. no. 33<br>del 16/04/2015, (in Italian).<br>This regional law shows the<br>organization of the<br>administrative functions of<br>the Provinces.   |

| Name of<br>document                                | Type of<br>document | Level | Binding /<br>non-binding | Author(s)                              | Year<br>published | Timeline for<br>future evaluation<br>/update) | Link (if<br>available)  | Summary of content  |
|--|---------------------|-------|--------------------------|--|-------------------|---|---|---|
| Council's<br>deliberation<br>no. 61,<br>22/12/2008 |                     | Local | Binding                  | Council of<br>Camerino<br>municipality | 2008              |   | https://www.co<br>mune.camerino.<br>mc.it/documenti<br>-cms/relazione-<br>piano-di-<br>protezione-<br>civile/ | Civil protection plan,<br>approved by council's<br>deliberation n. 61 of 22th<br>Dec., 2008, according to<br>Italian Law n. 225 of 24 <sup>th</sup><br>Feb., 1992. The municipal<br>civil protection plan defines<br>the preliminary activities and<br>tasks of the local civil<br>protection office (COC) and<br>the emergency reception<br>areas. |

## **11.3.** Key documents governing climate adaptation (see Section 5)

| Name of<br>document      | Type of<br>document | Level                 | Binding /<br>non-binding | Author(s)              | Year<br>published | Timeline<br>for future<br>evaluatio<br>n/update | Link (if available)   | Summary of content  |
|--------------------------|---------------------|-----------------------|--------------------------|------------------------|-------------------|---|---|---|
| Paris Agreement          | Agreement           | Internationa<br>I     | Binding                  | UNFCC                  | 2015-<br>2016     |   | https://unfccc.int/proc<br>ess-and-<br>meetings/the-paris-<br>agreement/the-paris-<br>agreement | The Paris Agreement builds<br>upon the Convention and for<br>the first time brings all<br>nations into a common<br>cause to<br>undertake ambitious efforts<br>to combat climate change<br>and adapt to its effects, with<br>enhanced support to assist<br>developing countries to do<br>so. As such, it charts a new<br>course in the global climate<br>effort. |
| EU Directive<br>2018/844 |                     | European<br>Community | Binding                  | European<br>Parliament | 2018              |   | https://eur-<br>lex.europa.eu/legal-<br>content/EN/TXT/?uri=<br>CELEX%3A32018L0<br>844          | Directive (EU) 2018/844 of<br>the European Parliament<br>and of the Council of 30 May<br>2018 amending Directive<br>2010/31/EU on the energy<br>performance of buildings<br>and Directive 2012/27/EU on<br>energy efficiency  |

| Name of<br>document  | Type of<br>document | Level                 | Binding /<br>non-binding | Author(s)              | Year<br>published | Timeline<br>for future<br>evaluatio<br>n/update | Link (if available)  | Summary of content  |
|--|---------------------|-----------------------|--------------------------|------------------------|-------------------|---|--|---|
| EU Directive<br>2012/27  |                     | European<br>Community | Binding                  | European<br>Parliament | 2012              |   | https://eur-<br>lex.europa.eu/legal-<br>content/EN/TXT/?uri=<br>celex%3A32012L002<br>7 | Directive 2012/27/EU of the<br>European Parliament and of<br>the Council of 25 October<br>2012 on energy efficiency,<br>amending Directives<br>2009/125/EC and<br>2010/30/EU and repealing<br>Directives 2004/8/EC and<br>2006/32/EC Text with EEA<br>relevance |
| EU Directive<br>2003/87  |                     | European<br>Community | Binding                  | European<br>Parliament | 2003              |   | https://eur-<br>lex.europa.eu/legal-<br>content/EN/TXT/?uri=<br>CELEX%3A32003L0<br>087 | Directive 2003/87/EC of the<br>European Parliament and of<br>the Council of 13 October<br>2003 establishing a scheme<br>for greenhouse gas emission<br>allowance trading within the<br>Community and amending<br>Council Directive 96/61/EC                     |
| COM/2018/738<br>Report on the<br>implementation<br>of the EU<br>adaptation<br>strategy | Report              | European<br>Community | No binding               | European<br>Commission | 2018              |   | https://eur-<br>lex.europa.eu/legal-<br>content/en/txt/?uri=ce<br>lex%3a52018dc0738    | Report from the commission<br>to the European parliament<br>and the council on the<br>implementation of the EU<br>strategy on adaptation to<br>climate change. Impacts of<br>weather and climate<br>extremes  |

| Name of<br>document   | Type of<br>document | Level                      | Binding /<br>non-binding | Author(s)              | Year<br>published | Timeline<br>for future<br>evaluatio<br>n/update                | Link (if available)  | Summary of content  |
|---|---------------------|----------------------------|--------------------------|------------------------|-------------------|--|--|---|
| EU Climate<br>Change<br>Adaptation<br>Strategy                                | Strategy            | Internationa<br>I (Europe) | Non-binding              | European<br>Commission | 2013              | Last<br>evaluate<br>d in<br>2018.<br>Update<br>likely<br>2021. | https://ec.europa.eu/c<br>lima/policies/adaptati<br>on/what_en#tab-0-1           | Framework and mechanisms<br>for improving the EU's<br>preparedness for current<br>and future climate impacts.   |
| Evaluation of the<br>EU strategy on<br>adaptation to<br>climate change        | Report              | European<br>Community      | Non-binding              | European<br>Commission | 2018              |  | https://ec.europa.eu/c<br>lima/policies/adaptati<br>on/what_en#tab-0-1           | This report examines the<br>process and the results of<br>the evaluation of the strategy<br>COM/2018/738, including<br>the lessons learned from its<br>implementation.  |
| SWD/2018/ 460<br>Adaptation<br>preparedness<br>scoreboard –<br>Country Fiches | Report              | European<br>Community      | Non-binding              | European<br>Commission | 2018              |  | https://eur-<br>lex.europa.eu/legal-<br>content/EN/TXT/?uri=<br>SWD:2018:460:FIN | Commission Staff Working<br>Document/Adaptation<br>preparedness scoreboard<br>Country<br>fiches/Accompanying the<br>document Report from the<br>Commission to the<br>European Parliament and<br>the Council on the<br>implementation of the EU<br>Strategy on adaptation to<br>climate change |

| Name of<br>document                   | Type of<br>document | Level    | Binding /<br>non-binding | Author(s)                       | Year<br>published | Timeline<br>for future<br>evaluatio<br>n/update | Link (if available)  | Summary of content   |
|---------------------------------------|---------------------|----------|--------------------------|---------------------------------|-------------------|---|--|--|
| Legislative<br>Decree no.<br>111/2019 | Law                 | National | Binding                  | Italian<br>Parliament           | 2019              |   | https://www.gazzetta<br>ufficiale.it/eli/id/2019/<br>10/14/19G00125/sg   | This law is aimed primarily at<br>adopting urgent measures<br>for the definition of a national<br>strategic policy to combat<br>climate change and improve<br>air quality. Urgent<br>interventions are also<br>introduced to resolve certain<br>environmental infringement<br>procedures |
| Legislative<br>Decree no.<br>216/2006 | Law                 | National | Binding                  | Ministry for the<br>Environment | 2006              |   | https://www.minambi<br>ente.it/sites/default/fil<br>es/archivio/allegati/e<br>mission_trading/Dlgs<br>_216-06.pdf    | National execution of he EU<br>Directives 2003/87,<br>2004/101/CE and Kyoto<br>Protocol on greenhouse<br>emissions   |
| National<br>Adaptation<br>Strategy    | Strategy            | National | No binding               | Ministry for the<br>Environment | 2014              |   | https://www.minambi<br>ente.it/notizie/strategi<br>a-nazionale-di-<br>adattamento-ai-<br>cambiamenti-<br>climatici-0 | The NAS provides a "State<br>of the art on scientific<br>knowledge of impacts<br>vulnerabilities and<br>adaptation of climate" that<br>illustrate in a depth, for<br>national territory, sectors<br>which are affected on future<br>impact of climate change                             |

| Name of<br>document  | Type of<br>document | Level    | Binding /<br>non-binding | Author(s)                       | Year<br>published | Timeline<br>for future<br>evaluatio<br>n/update | Link (if available)  | Summary of content   |
|--|---------------------|----------|--------------------------|---------------------------------|-------------------|---|--|--|
| National Plan on<br>adaptation to<br>climate changes       | Plan                | National | Non- binding<br>draft    | Ministry for the<br>Environment | 2017              |   | https://www.minambi<br>ente.it/sites/default/fil<br>es/archivio_immagini/<br>adattamenti_climatici/<br>allegato_2_impatti_e<br>_azioni.pdf | Report on the state of<br>scientific knowledge on<br>impacts, vulnerability and<br>adaptation to climate<br>change in Italy. Analysis<br>of the EU and national<br>legislation relevant to<br>impacts, vulnerability and<br>the 'adaptation to climate<br>change. Elements for a<br>National Strategy for<br>Adaptation to Climate<br>Change |
| PEAR 2020<br>Regional,<br>environmental<br>and energy plan | Plan                | Regional | Non- binding             | Marche<br>Region                | 2016              |   | https://www.regione.<br>marche.it/Regione-<br>Utile/Energia/Piano-<br>Energetico-<br>Ambientale-<br>Regionale                              | The Regional Environmental<br>Energy Plan (PEAR)<br>identifies the planning and<br>guidelines for environmental<br>energy policy in the regional<br>territory  |

| Name of<br>document           | Type of<br>document | Level    | Binding /<br>non-binding | Author(s)                   | Year<br>published | Timeline<br>for future<br>evaluatio<br>n/update | Link (if available)  | Summary of content   |
|-------------------------------|---------------------|----------|--------------------------|-----------------------------|-------------------|---|--|--|
| Regional Plan for<br>climate  | Plan                | Regional | Non- binding<br>draft    | Marche<br>Region            | 2007              |   | http://www.sinanet.isp<br>rambiente.it/gelso/ba<br>nca-<br>dati/regione/regione-<br>marche/schema-di-<br>piano-regionale-per-<br>il-clima-della-regione-<br>marche | The Plan intends to<br>systemise and make climate<br>change mitigation policies<br>more effective  |
| Forest fire<br>emergency plan | Plan                | Local    | Binding                  | Municipality of<br>Camerino | 2018              |   | https://www.comune.<br>camerino.mc.it/docu<br>menti-cms/piano-<br>incendi-boschivi/  | Local law to protect the<br>integrity of life, property,<br>settlements and the<br>environment from damages<br>or from dangers deriving<br>from natural disasters,<br>catastrophes and other<br>events |