D.5.2.2 Description of the design of the capacity building package

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Interreg Italy-Croatia: AdriAdapt

AdriAdapt is a project funded under the European programme Interreg Italy-Croatia and its objective is the improvement of the capacity of the urban and coastal areas of the Adriatic area to respond to the effect of climate change at local level and the implementation of the resilience of the territory.

The project has developed a set of operational tools to help cities to increase knowledge of climate phenomena at the regional and local level, regional and local, and to be able to plan and develop climate adaptation plans and actions that contain concrete and integrated actions to combat climate change. The project aims to improve local climate change adaptation capacity in Adriatic region by creating an information platform that provides access to guidance, data and tools that will help local authorities to take adequate policy measures and develop plans to increase resilience in urban and coastal areas.

The project has four major actions. The first is the improvement of available climate-related knowledge and the production of dataset and projections for detailed information on climate-related impacts in the Adriatic pilot areas. These knowledges are very important for decision making process.

The second is the elaboration of a climate information system and a knowledge platform for the Adriatic region. The system and the platform include best practices, guidance documents, legal frameworks and climate and vulnerability studies.

The third is the test-integration of the knowledge platform in Croatian and Italian pilot cities and urban areas, where adaptation and resilience plans will be designed.

The fourth is the dissemination phase of the information contained in knowledge platform. It has to be considered as a region-specific repository for climate policy and plans and it provides support and locally relevant data for follower cities.

The partnership of the project has been able to pool all skills and competences of relevant institutions in order to achieve the set of project results, having the capacity to create strong links to target groups addressed by the project.

This document is the deliverable *D.5.2.2 Description of the design of the capacity building package* and shows how the theoretical framework, described in the *D.2.4.3. Toolkit manual, has been followed and applied practically by the pilot areas within the project*.

1 Introduction

The Toolkit[1] is the ***guide-to-teach*** and tries to answer to the questions *How can we teach and guide who participate to planning processes?* It is a resource and a planning guide both for who will teach and disseminate "*adaptation planning for climate change*" and for who will learn and practice, such as **city planners**, **professionals,** and **technicians**, to better understand, assess and act on climate change at the local level, specifically in the Adriatic region.

This document has to be considered as the second part of the Toolkit and it is directly connected with theoretical framework of the Toolkit. This document shows what activities of the Toolkit has been followed and applied within the AdriAdapt project, by the pilot areas.

As the Toolkit teaches, the planning process is flexible and non-linear, and it should be designed on vary situations and realities, because different territories may present **different stages of planning**. This Toolkit's activities may be used for the **whole planning** process or only for a **few steps** by different local authorities, according to the needs or to the local level of planning. The pilot areas present different planning structures, authorities, administrative processes, technical and financial capacities and resources. Therefore, they have followed the needed activities.

Moreover, a cross-border working group elaborated a specific training action (courses, events, meetings…), to form and involve the local administration. In this way, it has been (or it will be) possible to fill the gap between the scientific knowledge and the practical activity.

A Capacity Development/Training Package (CDP) has been developed and drafted. The CDP has been used with a "learning by doing" and "train the trainer" approach to develop the actual capacity of specific figures, selected by the pilot areas, which have been trained through dedicated technical training sessions and supported by online assistance. These people, once trained, have become (or will become) potential trainers for their colleagues and local stakeholders.

[1] *D.2.4.3. Toolkit manual – Planning for adaptation in Adriatic region*

1.1 Structure of the document

The document follows the theoretical framework of the Toolkit and describes the activities carried out for and with the pilot areas.

The "second part of the Toolkit" shows what training courses and events AdriAdapt has concretely developed and how these have been implemented. These moments are included in a **long capacity building process**, through which experts and scientists have tried to raise up the level of skills and knowledge of local authorities and staff. As mentioned before and as described in the following pages, the training moments did not use all the available *activities* defined in the theoretical framework. The theoretical frameworks provide a line of approach, which must be adapted to the specific situations.

This is what has happened in the Adriatic experience.

- most of the pilot areas had already identified the actors, their geographical position and the relation with the macro-problem of climate change (Stakeholder management step).
- the first step of the training-learning process has been the definition of the problem related to the specific Adriatic region.
- the second step (*Multi-level perspective*, MLP) has been that mostly required by the AdriAdapt pilot areas. This step enabled to improve the knowledge framework and the context's vulnerabilities dataset and knowledge levels. The *activities* of this step have been used to teach and support local technicians and planners.
- the *Visioning* step has also been widely required and its *activities* has been used to better understand and visualized the possible scenarios, actions and pathways for the territorial-urban development.
- the last *activity* (within the *Management and monitoring* step) has not been used, but partially described and anticipated in some meetings and workshops (as future step beyond the project).

The **relationship between theoretical framework and AdriAdapt project** (*what activities have been used? Why and how?*) is the objective and the heritage of these two documents (D.2.4.3. and D.5.2.2.) because it shows a practical application of the theory. The **importance** of training events and courses on climate change adaptation at local level in the Adriatic region is remarked by the significant **increase of awareness and expertise** of the pilot areas' staff (and in the whole partnership).

2 Following the toolkit: practical experience

	Theorical framework	Practical experience
2.1	**STAKEHOLDER MANAGEMENT**	
2.1.1	ACTIVITY 1: Definition of the problem	✔
2.1.2	ACTIVITY 2: Identification and description of the actors	
2.1.3	ACTIVITY 3: Stakeholder's mapping, networks and problem affinity	
2.2	**MULTI-LEVEL PERSPECTIVE (MLP)**	
2.2.1	ACTIVITY 4: Definition of the context map	✔
2.2.2	ACTIVITY 5: Identification of change directions	✔
2.2.3	ACTIVITY 6: Barriers and blocks detection	✔
2.3	**VISIONING**	
2.3.1	ACTIVITY 7: Opportunities map	✔
2.3.2	ACTIVITY 8: Future story visualization	✔
2.3.3	ACTIVITY 9: Elaboration of the roadmap	
2.4	**MANAGEMENT AND MONITORING**	
2.4.1	ACTIVITY 10: Prediction of transition and project elements	

Table 2 - The *activities* used in AdriAdapt training experience

How to read the "practical experience"?

In this document, the theory turns into practice. AdriAdapt project has adopted an applicative approach and used some of the theoretical *activities* in the training sessions with the pilot areas and the involved stakeholders. The document explains *what and how* has been done in the training sessions and *how* the activities exploited are linked to the theoretical framework of the Toolkit.

2.1 Stakeholder management

Concerning the first phase, the project has used only the *activity* 1 (*Definition of the problem*). The main challenge of the project was the adaptation planning in the Adriatic region to respond to climate change into urban and coastal territories. For this reason, the first step of the project has been the overall framing of the problem (climate change), the definition of the context of the problem and the elaboration of methodological structure of the project.

The stakeholder management (network analysis and engagement) has been partially faced in the capacity building process and in the training sessions. Nevertheless, an important introduction moment has been organized to define the problem. *Why are we together in this project? What are we facing? And why?*

In the theoretical framework, the *activity* 1 has been presented with the help of a table that contains some questions.

Who are you? And why are you helping the stakeholders to find a solution to the problem? This is a very starting point and must be defined and clarified since the beginning of the planning process. In this case, the training course have been focused on climate change challenge and have been addressed to decision maker and local authorities. Therefore, they are the head of the whole planning process, and they have to make decision to put together the most of the actors' interests.

Can you define the problem with a big and wide picture? Climate change is a wide challenge and need more than one wide picture (figure 1 and 2). In the training courses, the climate change impacts and effects on urban and coastal context have been deeply described: urban heat island due to temperature raising, urban flooding due to waterproof and built soil and heavy precipitations, coastal erosion due to sea-level rise, etc.

What climate change related challenges are you facing? Climate change generates a variety of smaller challenges, depending on the specific impact. Heat, water, land, people, building, etc. The wide impact of climate change has been addressed in the first sessions of the training with the help of scientific data and visible consequences of the phenomenon.. Every area has its own climatic challenge to cope with and need specific options and measure to affect it vulnerability (these passes are described in the following paragraphs). Climate change adaptation is a very site-specific process.

The first sessions have tried to answer to these questions and to many others, such as *"How can you face technical challenges? How can you face social challenges? What resource do you have?*

And what would you need? How do you see the problem now? Is it enriched by the gather of the previous information? Can you define it more deeply?"

Figure 1 - Urban heat island is one of the most relevant impacts in the urban and coastal areas. The wide sealed areas increase urban temperature and urban-life discomfort (*Creative Commons Image*)

Figure 2 - Urban flooding is another relevant impact in the urban areas. The high and concentrated peaks of rainstorms and the sealed areas increase the flooding risk, and relative economic losses and urban discomfort (*Creative Commons Image*)

In the project, this initial moment has been carried out in different ways: workshops, online meetings, sharing of bibliography and thematic references. Each climate change impacts have been presented with the relative properties, causes and effects (figure 3). All the stakeholders involved have gained knowledge and expertise about these themes and have been prepared for the rest of the project and for their activities within local administrations, private enterprise, or in the every-day urban life.

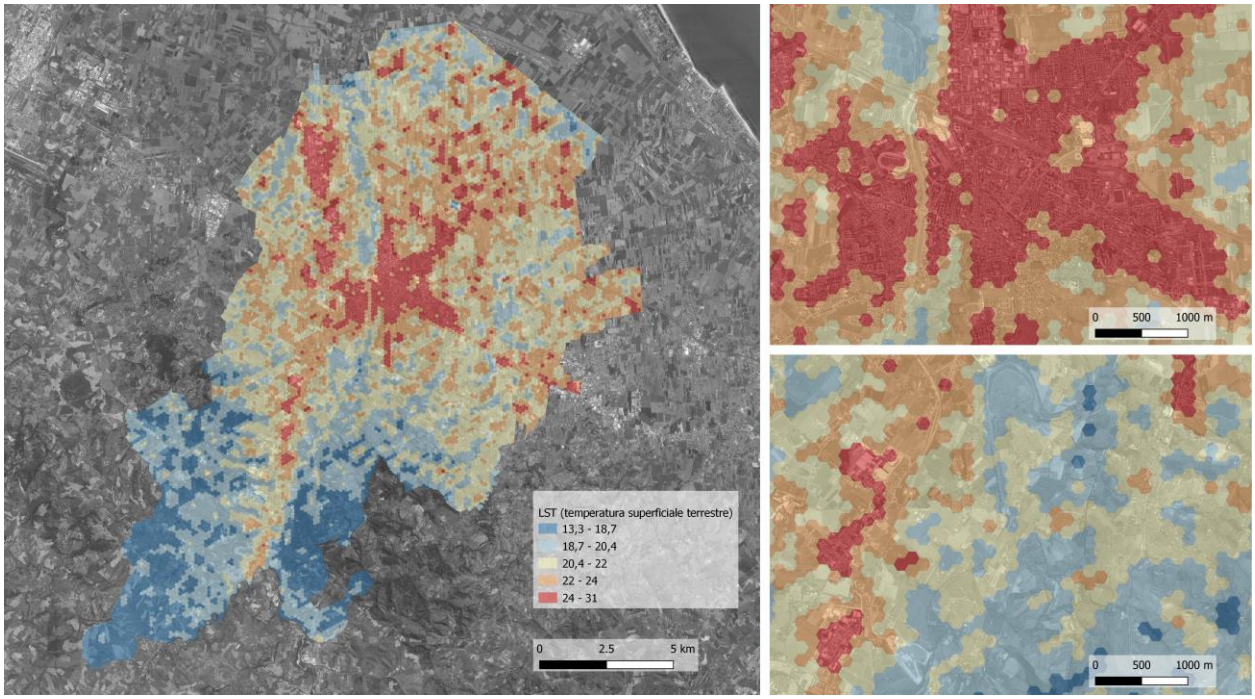

Figure 3 - Example of temperature analysis for the pilot area of the Municipality of Cesena and Union Valle Savio (images produced for the deliverable *D.5.1.2. - Report on specific vulnerability and feasibility analysis* for each pilot areas)

2.2 Multi-level perspective (MLP)

The *activities* of this section have been the most important and the most used within the project. The *activities* have been addressed both during the training sessions and in the online coordination meeting with all the partners of the project. At the same time, the steps described in the *activities* have been applied in the five pilot areas. The outcomes obtained are both methodological and scientific/statistic. The results are part of the heritage of the project and *have led/will led* to a wider knowledge framework, helpful for the building of a more complex and multi-level planning process.

The project has followed and applied the *activity* 4 (*Definition of the context map*), the *activity* 5 (*Identification of change direction*) and the *activity* 6 (*Barriers and blocks detection*).

In the next paragraphs, the *activities* are not described individually, even if they follow the theoretical framework of the Toolkit. The overall and specific studies of the territorial context, vulnerabilities and barriers/limits have been taught and applied as a macro *activity* based on a multi-level perspective approach.

First of all, a deep **analysis on climate conditions and projections** of the Adriatic region have been elaborated. The analysis has been put together with the analysis of the specific morphological conditions of the pilot areas territories.

A **wider knowledge framework** of the context has been elaborated, thanks to the gathering of data, the use of maps or spatial and visual technologies. A **cross-sectoral** analysis has been implemented to obtain an overall **context map** and to define the main assets of the territories. A relevant part of the analysis phase is the **vulnerability assessment** and the study of the potential impacts.

Since the project aims to improve the capacity of urban and coastal areas in the Adriatic area to respond to the effects of climate change, the study considered some types of impact potentially adverse to the dynamics of vulnerability of the five pilot areas (*Municipality of Udine; Municipality of Cervia; territories of Unione Valle Savio; Municipality of Vodice; Municipality of Šibenik*).

The analysis used a selection of spatial databases appropriately cross-referenced, geo-referenced and elaborated in a multi-objective context: a database of cartographic material and documentary information (municipal, regional, national) on the status of infrastructure structures, settlement systems, morphologies and ecosystems.

This activity aimed to develop a methodology for resilient representation of the territory and to provide local communities with efficient and effective climate change adaptation planning models.

These models can ensure an adequate level of economic and social well-being for the local urban environment. The studies have been first elaborated on the five pilot territories and then explained in the training courses or other events.

Figure 4 - Debate on scientific territorial data, with local actors (*AdriAdapt training courses and events, Vodice*)

The work has been carried out, following these phases:

- collection of sources, data and information on knowledge, policy and planning frameworks, as well as on any pre-existing environmental vulnerability constraints;
- construction of a general interpretative model to support the definition of the selected climatic impacts;
- description of the areas of intervention, referred to available documentation;
- identification of the main impact relationships between the territorial characteristics and the environmental sectors considered;

- identification of the formulation of environmental vulnerability conditions;
- identification of strategic priorities for preventive adaptation to climate change, through a multi-disciplinary and multi-scale climate proof approach focused on local specificities.

The work will attempt to analyse and map the following impact dynamics: Urban Heat Islands, Urban flooding/runoff, Wildfire, Drought, Landslides, Sea-level rise and Salt in (Saltwater intrusion).

Impact	Udine	Cervia	Cesena (Comune dell'Unione Valle Savio)	Comuni dell'Unione Valle Savio	Vodice	Šibenik
Urban Heat Islands	■	■	■		■	
Urban flooding/run off	■	■	■		■	■
Wildfire				■		
Drought				■		
Landslides				■		
Sea-level rise/coast erosion		■				
Salt in (Saltwater intrusion)		■				

Table 1 – Municipalities and types of impact

The vulnerability has been assessed through a GIS including a set of vulnerability maps. Using ad hoc statistical models, it has been possible to correlate the analysis of the impacts to geomorphological features by a variety of land use patterns and satellite indexes.

This approach used a series of information and technological contents capable of quantifying the potential impacts through a reading of the components of the vulnerability. The proposed method

allowed a first analytical assessments using a series of indicators classifiable by thematic orientation.

The impacts of climate change include multiple environmental interactions, which may in turn be related to other effects generated by climatic variations: variations caused by both exogenous and endogenous phenomena. The type of impact and its relationships with the sensitivity and adaptive capacity dimensions play a fundamental role in defining the vulnerability model, with significant differentiations respect to the relationship between the natural and anthropic areas of the territory.

The methodology includes four main stages:

1. Identification of data source and data collection.
2. GIS techniques for the development of indexes.
3. Construction of geodatabases.
4. Definition of guide models for vulnerability assessment.

The vulnerability assessment has been elaborated considering the spatial dimensions of the territories. In the figures below, the visual representation of the data produced helps to understand the main vulnerable area and guide trough the following decision-making processes. In the training course, this aspect has been considered as the crucial step for moving from studies to decisions, from science to policy, from knowledge to action.

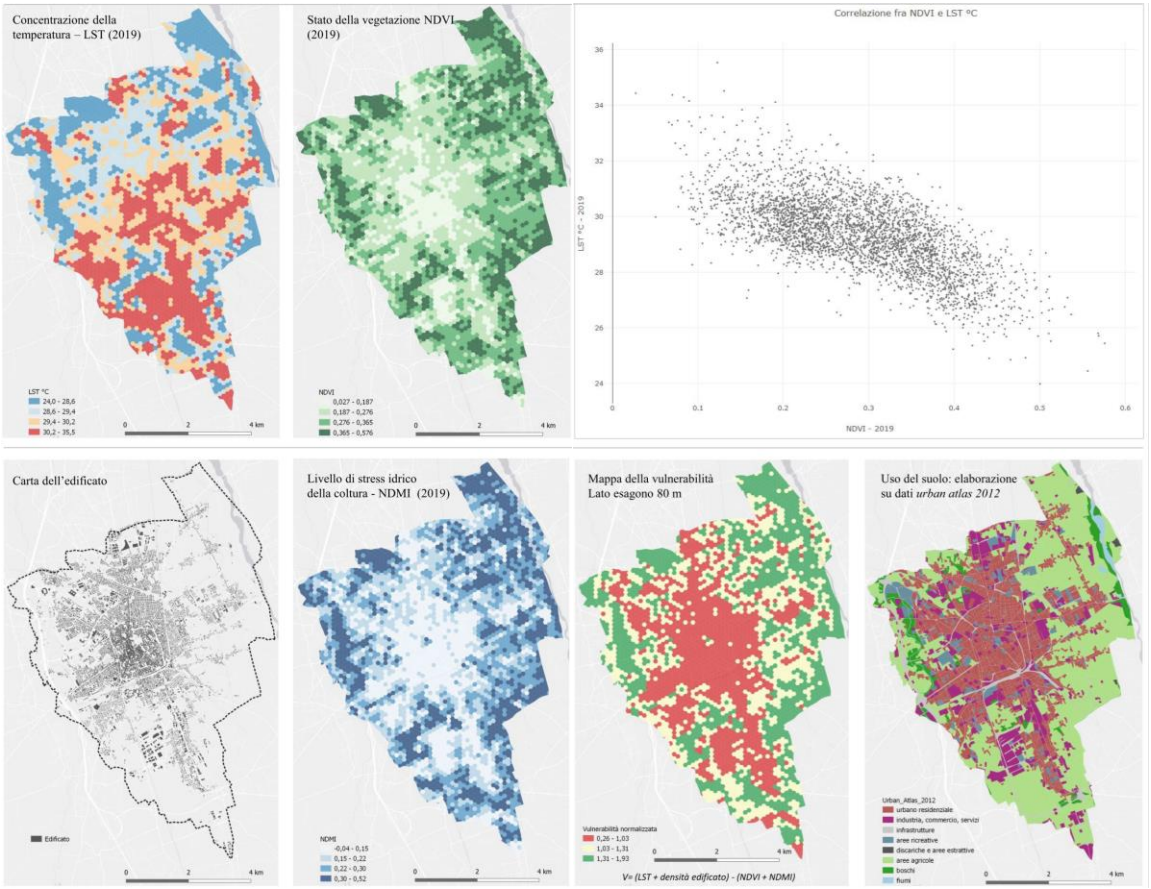

Figure 5 – Vulnerability analysis for the Municipality of Udine: informative layers of sensitivity (LST and building), adaptive capacity (NDVI e NDMI), normalized vulnerability (UHI) and land use (2019) (images produced for the deliverable *D.5.1.2. - Report on specific vulnerability and feasibility analysis* for each pilot areas)

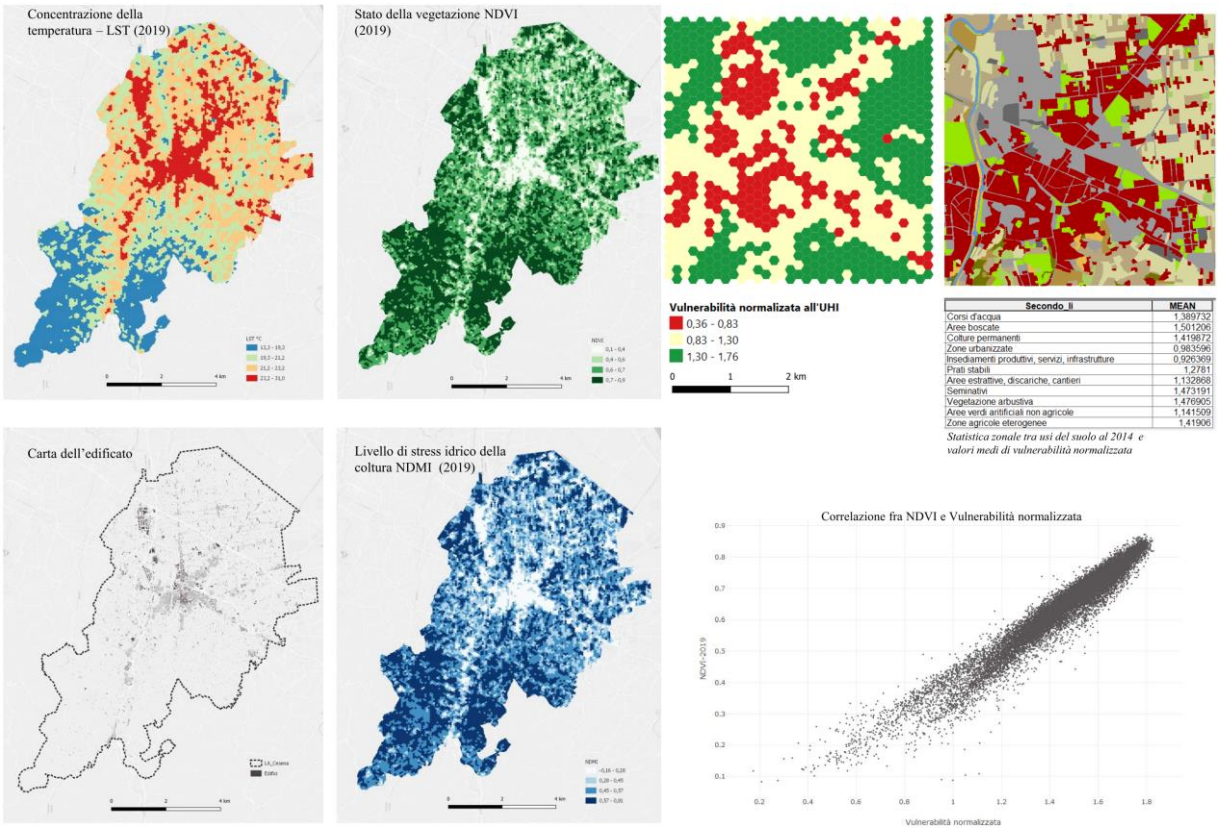

Figure 6 – Vulnerability analysis for the Municipality of Cesena and Union Valle Savio: informative layers of sensitivity (LST and building), adaptive capacity (NDVI e NDMI), normalized vulnerability (UHI) and land use (2019), and specific analysis of Cesena city centre (images produced for the deliverable *D.5.1.2. - Report on specific vulnerability and feasibility analysis* for each pilot areas)

The vulnerability analysis has been elaborated for the five pilot areas with the same methodology but for different impacts. At the same time, the project activities focus on the analysis of stakeholder's **perception, information, barriers, limits and hotspot** of the territories, according to different perspective and point of view. This work has been done in an open and accessible participatory process, producing an interesting debate and dialogue on different scale. These moments have been impressed in a series of *community maps*, very useful for the overlapping with vulnerabilities assessment (figure 7-8-9).

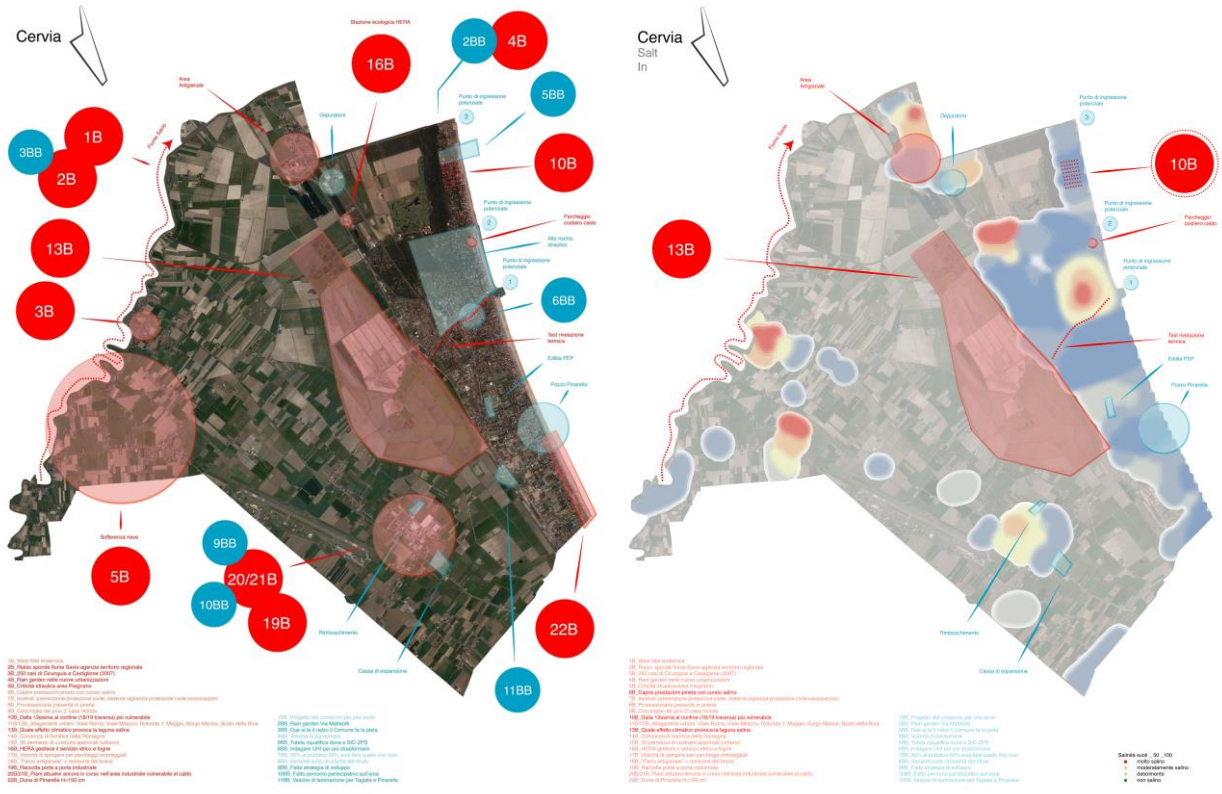

Figure 7 – Vulnerability analysis for the Municipality of Cervia: on the left the maps of perception and local-critical situation; on the right map of perceptions overlapped with salt-In vulnerability assessment (images produced for the deliverable *D.5.1.2. - Report on specific vulnerability and feasibility analysis* for each pilot areas)

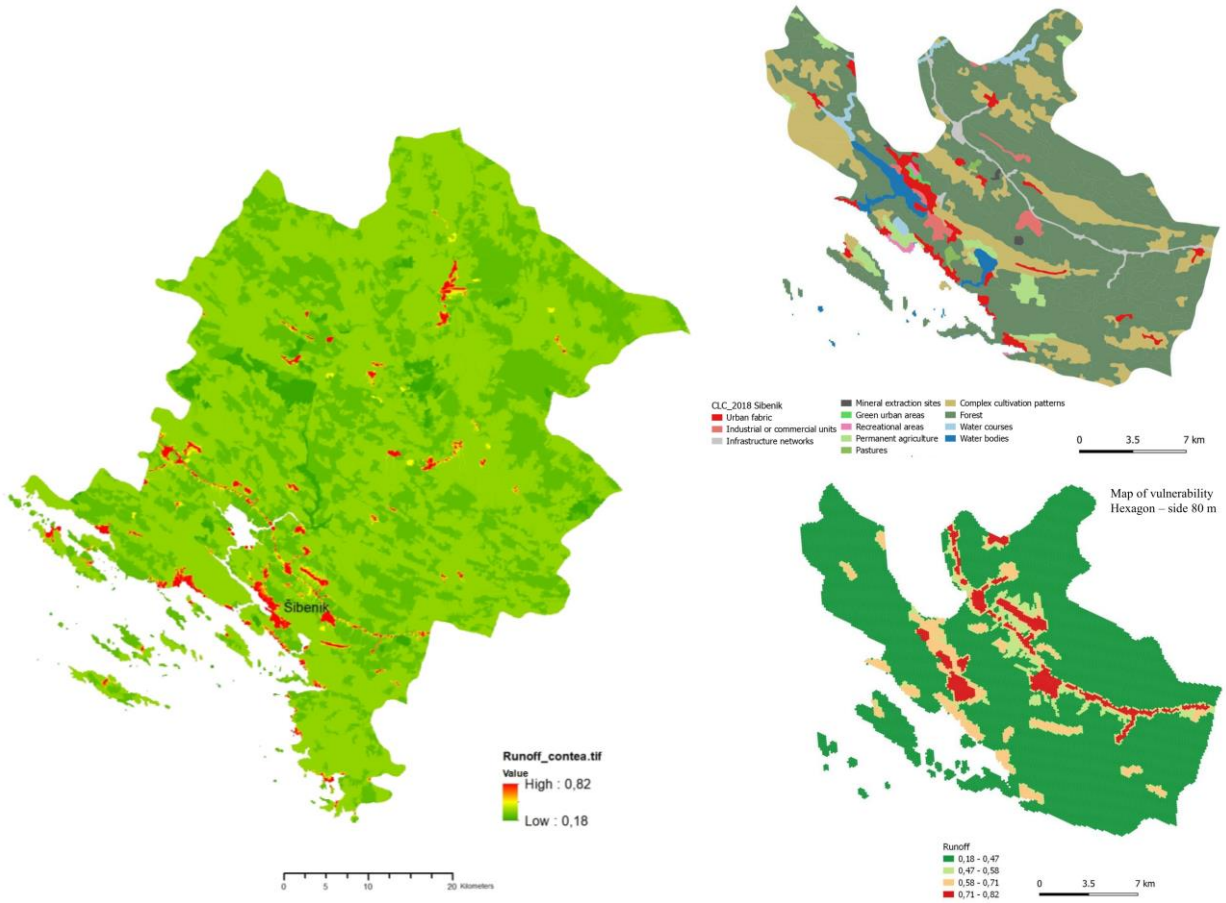

Figure 8 – Vulnerability analysis for the Šibenik-Knin County: on the left the maps of estimation of hydraulic system of Šibenik-Knin County (land-use-model 2018); on the right the map of the vulnerability (runoff) calculated on land-use-model (2018) and comparison with different land uses (images produced for the deliverable *D.5.1.2. - Report on specific vulnerability and feasibility analysis* for each pilot areas)

All these studies brought a large amount of information very useful for the next steps of the planning process. For each climatic impact, a list of results, limits, opportunities and perspectives have been highlighted to provide a final report for the future improvement for local authorities.

Urban Heat Island

The study has allowed to spatially contextualize the vulnerability to heat waves in relation to different types of aggregation (both natural and anthropic): morphologies of the built, type-morphologies, urban green areas, wetlands, rural spaces and so on. The first results showed that the presence of vegetation in the city plays an important role in the mitigation of the island of heat. This suggests considering the multifunctional aspect of green space using an eco-systemic urban project of connection between urban green areas and extra-urban green areas.

Run-off and landslides

The study of the runoff has allowed to model, and therefore to simulate, the behaviour of surface waters with consequent determination of the inflow and outflow areas. This resulted in a map index that sets the thresholds of hydraulic criticality calculated and weighted on the morphology of the territory and on the hydraulic response of land uses in terms of the capacity of absorption of meteoric water. These areas should only be considered as geographical-territorial partitions with a certain vulnerability to flooding, which will vary depending on the intensity of the pluviometric event and its spatial distribution.

The methodology has allowed to contextualize spatially the hydraulic vulnerability highlighting how and how the waterproofing of the soils affects the hydraulic system of the territories and the process of consolidation of the landslide soil. The vulnerability of a territory to landslides should be attributed to the erosive action of the outflow of surface waters, as well as to a reduction of the aggregate action of the roots and the evapo-traspirative capacity of the vegetation. With regard to deep landslide movements, the phenomenon requires adequate scientific-technological sinks.

The results obtained can be taken as the basis for the typing of *Piano di Assetto Idrogeologico (PAI)*[2] also on an urban scale, favouring the connection between structural, operational and climate change management planning.

[2] Hydrogeological Plan

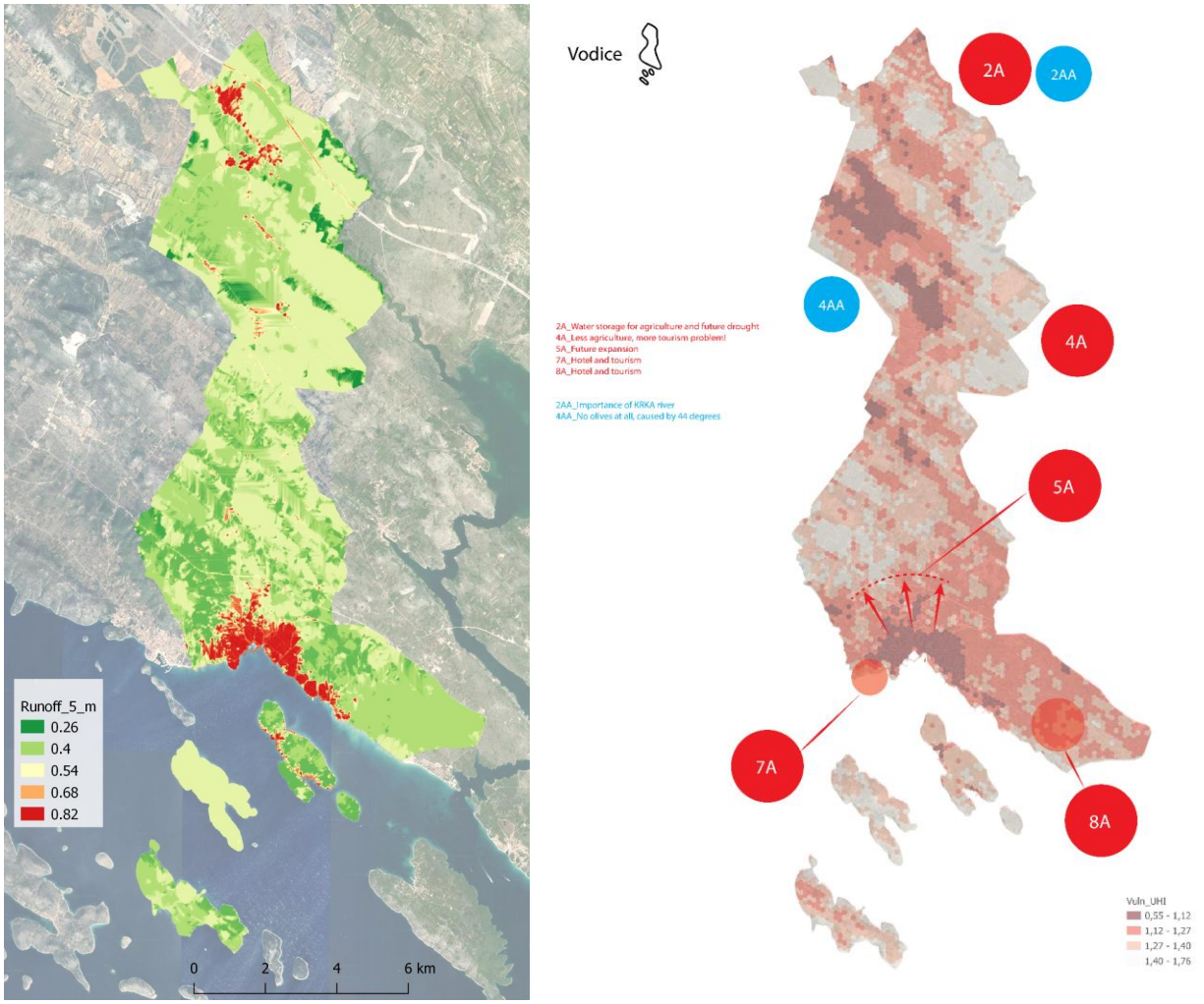

Figure 9 - Vulnerability analysis for the Municipality of Vodice: on the left the map of the estimation of hydraulic system of the Municipality of Vodice (land-use-model 2020); on the right the map of perceptions overlapped with UHI vulnerability assessment (images produced for the deliverable *D.5.1.2. - Report on specific vulnerability and feasibility analysis* for each pilot areas)

Wildfire and drought

The study carried out in the territory of the Unione Valle del Savio have revealed an important connection between drought and fires; a lower water content of the vegetation corresponds to a greater propensity to flames. The analysis can be integrated with further empirical investigations related to the modelling of climate variables (for example: precipitation, temperatures, humidity

patterns and extreme events) in relation to the plausibility of hazardous scenarios in a context of global change.

Sea-level rise

The analysis of the vulnerability from raising of the level of the sea will have to be integrated with empirical surveys structured on the base of digital models of the soil and hydrodynamic analyses in a position to simulating the iteration with the extreme event regarding the characterization morphology given by altimetry over the entire coastal and retro-coastal.

Salt in (Saltwater intrusion)

The study has allowed to contextualize spatially the vulnerability to the saline propensity of the various arboreal species present in the municipality of Cervia. The survey can be used as a basis for more detailed surveys on the quality of the arboreal heritage and its level of resilience with a view to adapting to climate change.

All the results, and the methodology, have been considered within training sessions to *build up the capacity of local actors and decision-makers*. During the meeting, other territorial dimensions have been addressed as well, such as the land use type and building type (figure 10) or the flow chart for impacts assessment (figure 10). This further step completes the overall analysis of the territory and highlights the *necessity of the multi-level perspective while facing complex challenges* like climate change.

In the next paragraphs, dedicated to the visioning and planning *activities*, the **relation between analysis and decision** is as evident as important to pursue. The practical evidence is a value of AdriAdapt project, which applied part of the theoretical frameworks. All the analysis method and tools originate from the scientific theory, become practice and get back to theory as teaching-learning materials and results. ***This is a great result for the project and a great value for the two documents (D.2.4.3. and D.5.2.2.)***.

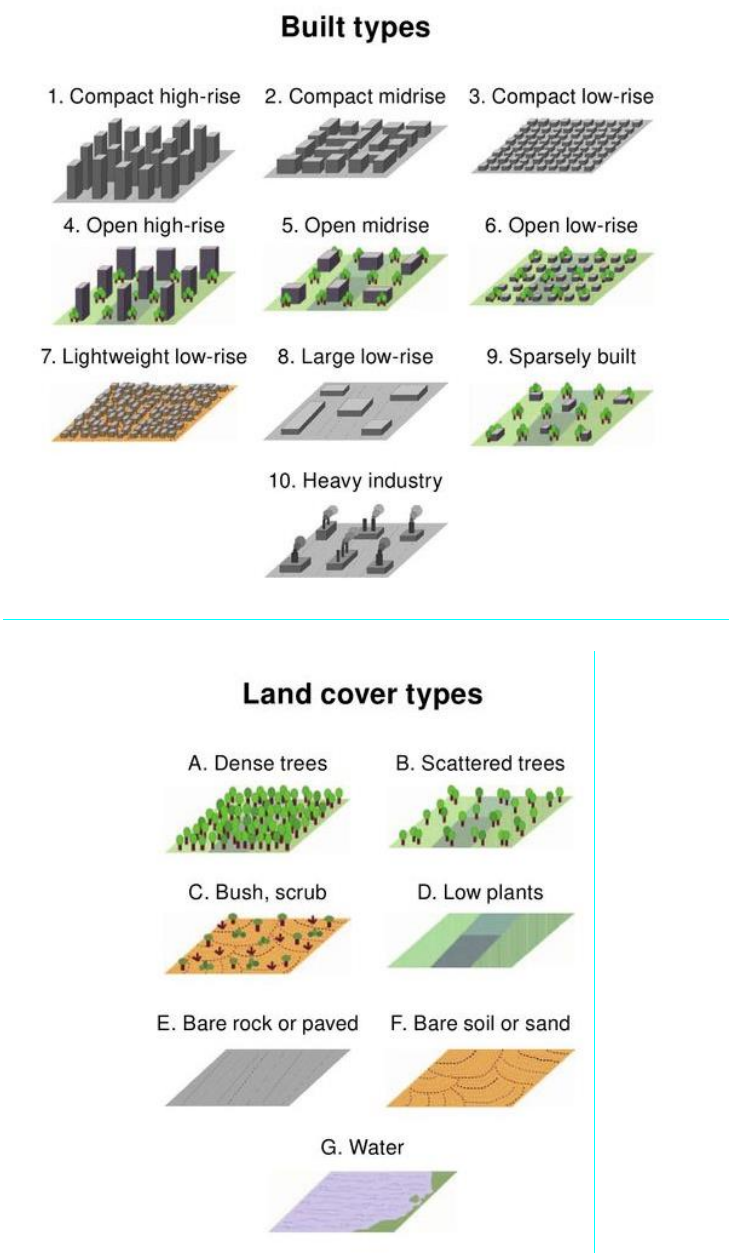

Figure 10 - Analysis of built types and land cover types, explained during the training events (Stewart, I. D., & Oke, T. R. (2012). Local climate zones for urban temperature studies. Bulletin of the American Meteorological Society, 93(12), 1879-1900)

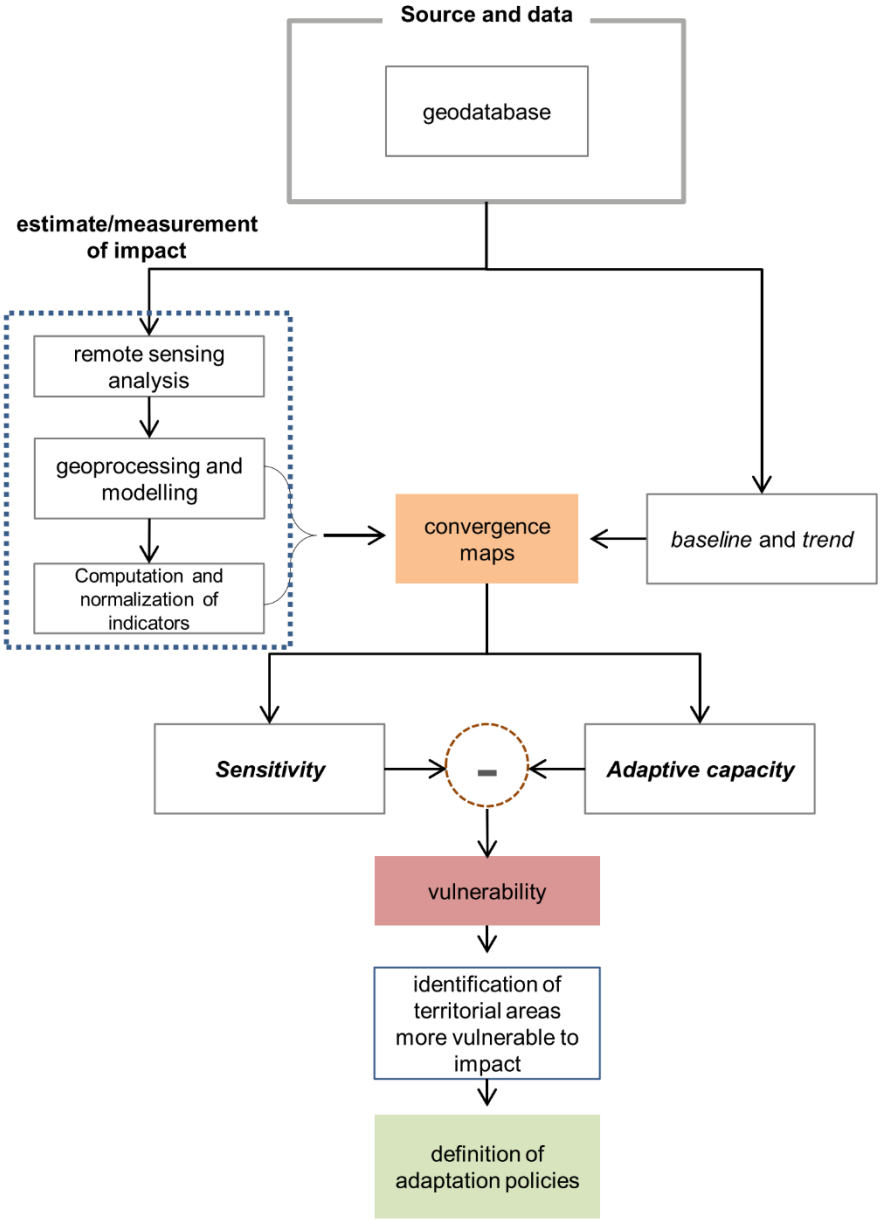

Figure 11 - Flow chart for the morphological study of impacts, explained during the training events (image produced for the deliverable *D.5.1.1. - Report describing a common methodology for vulnerability and feasibility assessments for cities, coastal and maritime areas for the Adriatic*)

2.3 Visioning

As previously mentioned, the great step of Adaptation Planning is moving *from science to decision*. The effort for the vulnerability assessment and all kinds of analysis must turn into a useful and helpful *activity* of decision. The vulnerability equation (**vulnerability=sensitivity-adaptive capacity**) is very important to guide the decision-making process in the right direction.

Adaptation intervention fields aim at reducing sensitivity and increasing adaptive capacity (resiliency). The following table shows the main indicators of both variables of the equation, guiding us towards the right approach, decisions and finally actions (on the left some of the indicators of sensitivity, on the right some of the ones of adaptive capacity).

sensitivity	**adaptive capacity**
% waterproof land	Land volume on sea-level
% built land	Alarm system
Green surface per capita	Emergency protocols and procedures
Population density	Budget for environmental management
% old people alone	Trees distribution
runoff	% cooled dwellings
Surface/flooding time	n. adaptation planning
Foreigner people	Income per capita
Poor people	n. forest employees
n. underpasses	n. agriculture employees
Young people	% nonemployees
Draining surface	% graduates
…….	…….

Table 2 - Indicators of sensitivity and adaptive capacity (source: Life MasterAdapt[3])

The project has followed and applied the *activity* 7 (*Opportunities map*) and the *activity* 8 (*Future story visualization*). The *activities* have been considered both during the training sessions and in the online coordination meeting with all the partners of the project. At the same time the step described in the *activity* have been applied in the five pilot areas, wherever possible. The outcomes obtained are both methodological and scientific/statistic. The results are part of the heritage of the project and have led/will led to a wider knowledge framework, helpful for a deeper insight of adaptation visioning and options.

[3] MASTER ADAPT "Linee guida, principi e procedure standardizzate per l'analisi climatica e la valutazione della vulnerabilità a livello regionale e locale" (Azione A1 - https://masteradapt.eu/strumenti/)

In the next paragraphs, the *activities* are not described individually, even if they follow the theoretical framework of the Toolkit. The opportunities map and the future story visualization are part of the same guiding process towards a stronger awareness and knowledge of climate change impacts and of adaptation possibilities and options.

First of all, a catalogue of practices has been elaborated to put together different approaches, methodologies, projects and actions, facing the common challenge of climate change in urban and coastal areas. The examples have been gathered to be shared in the training sessions and to open local authorities' point of view. The sharing of different experiences is an important step to cope with a problem. *How do other contexts face the same challenge? Does it work or not?*

Figure 12 - Piazza Verdi, La Spezia: an example of urban spaces design according to the adaptation planning and designing guidelines (*Creative Commons Image*)

After the overview of similar practices, starting from the mainstream classification of adaptation options (copying, incremental, transformative - figure 13) and measures, the capacity building process have shown different example of application and how they work over the years (time of life and frequency of the impacts).

The climate change impacts, previously analysed in the vulnerability assessment, are in this phase further described and linked to the land use and the possible strategies to reduce sensitivity and increase adaptive capacity. There are many solutions for each impact, and they have been addressed in the training sessions to improve the knowledge and expertise in terms of adaptation option evaluation and decision. The visual representation and images are important to disseminate the actual value of the impacts and the relative solutions (figure 14).

For the five pilot areas, a future story visualization has not been literally produced, but the capacity building process provides a wide presentation of adaptation options and measure to face all the impacts assessed in the vulnerability analysis. This connection is very important to show first the territorial sufferance (vulnerability), then the future effects or projections, and finally the possible options to avoid the increasing of the vulnerability or to decrease it.

The options described faced the following impacts: urban heat island, runoff and urban flooding, landslides, salt in, coastal erosion, wildfire and drought. The first (UHI and UF) have required more time due to the relevancy in the urban context and to the effects they produce in the every-day life.

All the options have been classified in terms of scale (small, medium and large), to guide into the whole set of possibilities of adaptation planning (figure 15, 16 and 17). In addition to physical options, the policy instruments have been presented together with the overall scheme of planning process, to understand how to affect the vulnerability of the territory.

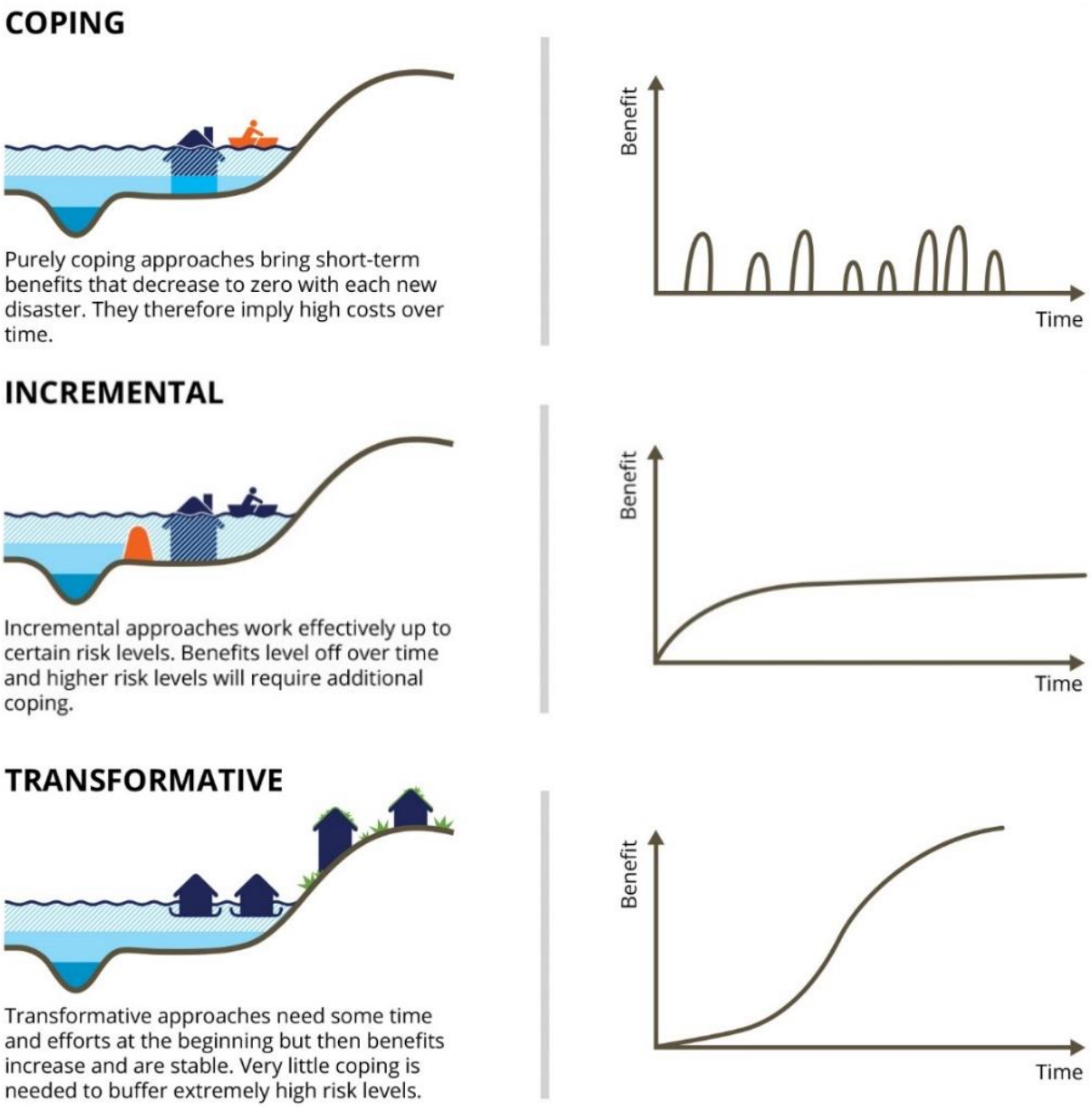

Figure 13 - Copying, incremental and transformative adaptation approaches (*EEA, 2016*)

Figure 14 - Flooding and an example of copying approach in a riverside context of the Pianura Padana in Italy. A green levee blocks the river and the riverbed is totally occupied by the water. (*Creative Commons Image*)

Figure 15 - Small scale adaptation measures, explained during the training events

Figure 16 - Medium scale adaptation measures, explained during the training events

Figure 17 - Large scale adaptation measures, explained during the training events

The project asked a final report to the pilot areas in order to record both the activities and the improvement after the training process of the project. The results are qualitative but demonstrate an increased capacity to dialogue and argument about adaptation planning. This acquired knowledge will be very useful within the local authorities and for the planning of the territories, with a more integrated and cross-cutting approach. The planning for the adaptation to climate change must be integrated with the other forms of planning and the project pushed all public/private actors in this direction.

This document shows how the capacity building process can take only some *activities* from the theoretical framework, according to the local necessity and the level of the local planning. This document can be helpful for those who cope with adaptation planning (teaching/acting) and need a guide to organize the process.

2.4 The importance of a methodological framework

The importance of the methodological framework is addressed more extensively in the *Guidelines - Planning for adaptation in Adriatic region*[4]. This section presents the key steps in the planning process for adaptation to climate change, highlighting the relevance of the methodological structure. Some of the *activities* described in the theoretical part of the toolkit (and what has been done concretely in the AdriAdapt project) can be traced within the document.

In addition to the organization of meetings and workshops (dedicated to the definition of the problem, namely climate change on a global and Adriatic scale), within the project the theoretical-scientific guide conducted events and courses on how to methodologically set up the planning process. Together with the great contribution offered for the collection and processing of spatial data, the construction of a methodological framework, and the awareness of its relevance, represents an important legacy of the project, both for the pilot areas involved and for all areas requiring the same information.

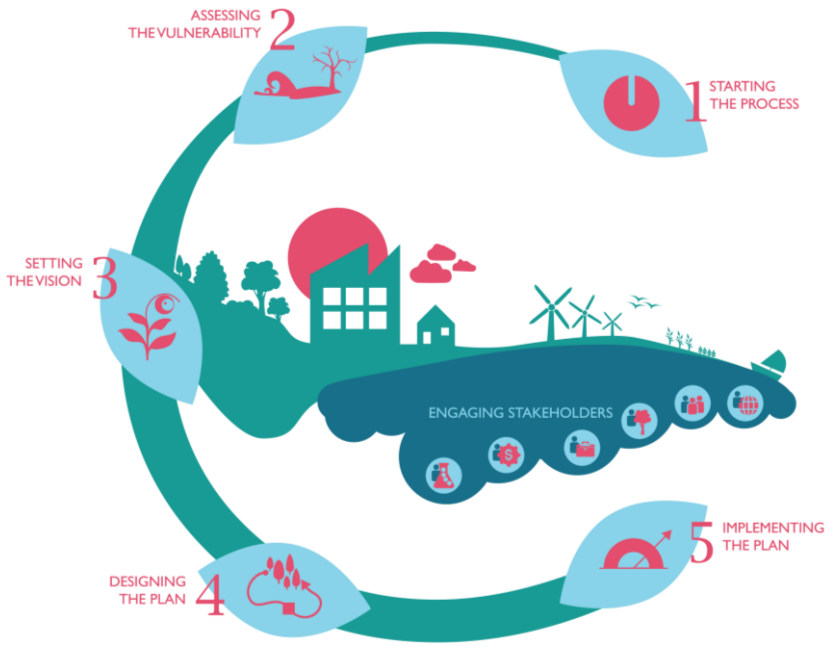

Figure 18 - The scheme of the AdriAdapt Integrated Adaptation Planning Tool (*D.5.4.1. - Guidelines - Planning for adaptation in Adriatic region*)

[4] Deliverables 5.4.1 of AdriAdapt project

Figure 18 shows the 5 steps of the Integrated Adaptation Planning Tool. As already mentioned, the process is not linear and does not necessarily have to be followed along all its steps. The process should be adapted to the knowledge, technical and administrative conditions of the reference territory. In some cases, a territory may have enough data to conduct the process without going through step 2. In others, however, the planning process for adaptation may not have started yet and therefore the starting point is step 1. In others, the process may have been under way for years and may require monitoring and reorientation.

In the following paragraphs, the methodological framework of planning for adaptation is reflected through some questions that make you think about the direction to follow and what has already been done, both within the AdriAdapt project and in the wider context of adaptation to climate change. These questions once again highlight the importance of having a guide and a methodological framework of reference. This concept has been addressed throughout the project, through courses, meetings, information events and dissemination.

- Who deals with what, what are the roles and relationships within the planning process?

  The definition of the governance of the decision-making process is crucial for the identification of the scope of action, for the choice of priorities and for the selection of the different actions of an adaptation strategy. It is necessary to identify the roles, assign the responsibilities of the different political decision-makers and local administrators and determine which are the implementing instruments. The definition of governance allows everyone to be able to fulfil their task, in accordance with their role, their mandate and their competences.

  In addition to the governance structure of the decision-making process, the involvement and participation of additional actors and stakeholders of the territory is important to widen the pool of sharing. The effectiveness of an adaptation strategy also depends on the degree of sharing between the spheres that make up society: preventive involvement often makes it possible to face and mitigate environmental, social, economic, communication, information, and behaviour barriers.

Figure 19 - Knowledge exchange among local actors and authorities (*AdriAdapt training courses and events, Udine*)

The involvement and participation of local stakeholders are implemented through a shared process of information, communication, active collaboration and dissemination (workshops) and skills building (training of technical operators, education to and with stakeholders). The path of individual and collective growth and participation must be maintained throughout all phases of the adaptation strategy (from conception to implementation).

- What do we know and what do we need to know in order to understand how to move towards an adaptation strategy?

  The collection of data and information is essential for the creation of a framework of knowledge and to increase the level of knowledge of the territory. Information may include physical, morphological, demographic, social, settlement, institutional, programmatic, environmental and landscape variables.

Building the knowledge framework is one of the first crucial steps in developing an adaptation strategy. Often the cognitive frameworks available are very poor. In some virtuous cases the territory is equipped with databases and levels of information of great interest and importance. Therefore, the search for new data and knowledge (and the control of the quality of these data within the limits of time and resources granted) is fundamental in the strategic process, especially in portions of territory or complex geographical areas such as the Adriatic.

Despite the perennial state of uncertainty and incompleteness of data and knowledge due to the variables of the territory, the definition of levels of knowledge and database is the starting point for the construction of the strategic process. The implementation of databases and knowledge of the territory is an integral part of the strategy and is outside the time horizons of the strategy. The scientific collection of data and information must be an objective constantly pursued by the actors of government of a territory, regardless of the political and strategic times and in a joint way to them. The same strategy can sometimes point to the need to broaden the knowledge bases and specific insights at the service of reorientation decision-making.

Figure 20 - Dissemination moment on the importance of knowledge frameworks and datasets of the territory properties and vulnerabilities (*AdriAdapt training courses and events, Cervia*)

- What are the objectives, the results we want to achieve, the time frame for achieving them and the measurement indicators?

  The definition of the scope of intervention, the construction of a governance structure and the creation of a knowledge framework enable us to identify scenarios, priorities and objectives. These have to be implemented through strategic actions and measures, and measure by indicators that allow the assessment of the state of progress and effectiveness of what is being done.

  The identification of objectives and indicators represents the transition from study to prefiguration, from knowledge to decision, from data to strategy. The transition is important because it details the strategy's macro-objectives in expected results at a smaller scale. In this document it is not relevant to go down in the classification of the indicators, but rather to understand that this is the moment of design of the strategy, in which the action is accompanied by an indicator of performance or descriptive measurement.

Figure 21 - Objectives, expected results and time, indicators (*AdriAdapt training courses and events, Udine*)

To each objective corresponds one or more actions finalize to the achievement. The interaction between objective-action-indicator allows to configure more alternatives that can be shared with the pool of actors in the decision-making process, both to ensure the best choice, and to increase the awareness of complexity and possibilities of the various scenarios.

The complexity of the definition of objectives and indicators underlines once again the subjectivity of the process and the strong political nature of the choice. In order to reduce subjectivity, the participating process is useful and help to identify what are the real priority objectives and to assess conflicts and synergies in the field. This avoids conflicts and debates that do not reflect real territorial needs.

The quantitative assessment of the effects for each proposed alternative must take into account synergies and cross-effects of the actions, in order to ensure a participative, shared decision-making process that represents the real demand of the territory. Evaluation of the effects and involvement of governance and local actors at all levels increases the chances of success of a strategy and therefore the achievement of objectives and the containment of undesirable effects.

Figure 22 - Debate on the importance of the assessment of synergy and cross-action effects (*AdriAdapt training courses and events, Cesena and Union Valle Savio*)

The assessment of direct and immediate effects is important but not the only one to be pursued. The assessment of synergy and cross-action effects is also relevant in terms of both positive reports and unwanted consequences. Moving within the scope of adaptation planning and sustainability, strategies should aim at cross-sector effects in order to generate positive effects and benefits for integrated resource management. This interaction/integration must then fall back to the spatial level, transforming the large-scale vision into measurable changes on a local scale.

Interactions can also have undesirable effects, for which it is necessary to provide for reorientation and compensation actions and measures, even if different from those of the original strategy. In this sense, the strategy must be flexible, favouring a monitoring and updating mechanism.

- How can we make a strategy flexible so that it can be monitored and re-directed, if needed?

In a fluid context, in continuous transition (demographic, economic, environmental), in the uncertainty and complexity of forecasting and planning, the strategy must be flexible: leave the possibility of updating and modification following the deepening/change of the knowledge frameworks, administrative, legislative conditions, or undesirable effects, generated by the same strategy.

Adaptation is not a linear process, it is cyclical and iterative, where there is a need for a continuous mechanism of action-feedback-action. But how can we give a flexible character to the actions of a strategy?

The flexibility of the actions (and in general of the whole strategy) is based on indicators that measure the evolution of an action/measure also in a transitional regime. Investment in monitoring is central to the effectiveness of actions and strategy and allows for the possible reorientation of actions and the achievement of the objectives set.

Figure 23 - Rethinking planning and integration between plans (*AdriAdapt training courses and events, Cervia*)

The *reorientability* of the strategy or individual actions is directly proportional to the resilience of the territorial system and therefore it is necessary to invest in the ability to react effectively and to recover systemically under variable environmental conditions and in the flexibility of decision-making. The governance structure must be able to accommodate change and to take action to mitigate and offset any adverse effects.

3 Conclusion

From the practical experience of AdriAdapt project, we learn that increasing skills and awareness in terms of adaptation to climate change are the basis for an effective planning process. The methodological knowledge of a process and the ability to adapt this structure to the reference territorial reality are fundamental elements for planning the territory.

If the **Toolkit offers a theoretical look** at the recommended *activities* for a planning process for adaptation and this document opens **a practical parenthesis** on the specific experiences of the project. The interaction of these two elements (theory and practice) shows how each context follows a different path compared to the others due to the resources and variables involved. The flexibility of the proposed methodological framework (partly applied in the AdriAdapt project) allows to fit into any step, according to the needs of the specific context.

The working group has designed and applied a detailed training action, organizing courses, events, meeting, seminars and webinars, to form and involve the local administration. A small step has been done to fill the gap between the scientific knowledge and the practical activity.

The Capacity Development/Training Package (CDP) has developed the capacity of specific figures of the pilot areas, through a face-to-face training process and a remote-mode support and assistance. The capacity, the skills, the expertise of these figures have increased along the project and it is now at a higher level than the beginning of the capacity building action.

The efforts demanded and offered are visible in the results of the project, both in terms of useful data and materials and knowledge and experience gained during the project. Even the trainers have gathered benefits from the training process. The pilot areas and their territories have now a stronger group of planners, decision makers and other technical and administrative figures.

In conclusion, a final note should be made on the abnormal conditions caused by the **social and health situation** that we are still experiencing. Especially in terms of training, education and communication, the pandemic situation has forced all the moments of the project to be in remotemode. This has led to a **serious decrease in the possibility of exchange and communication**, interaction and learning, reducing the means of communication and dissemination of the contents of the project. Technology in this sense has helped to keep the project network alive and to achieve excellent results through courses, lessons, seminars and online meetings.