

Shelter

Sustainable Historic Environments
hoListic reconstruction through
Technological Enhancement &
community-based Resilience



**Extract of D4.2 – Strategy for early recovery roadmap
Ravenna Roadmap**

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Glossary

Acronym	Full name
BBB	Build Back Better
CA	Consortium Agreement
CCA	Climate Change Adaptation
CH	Cultural Heritage
CNH	Cultural and Natural Heritage
CNHM	Cultural and Natural Heritage Management
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DoA	Description of Action
HA	Historic Area
LDRM	Local Disaster Recovery Manager
EC	European Commission
EOP	Emergency Operations Plan
NH	Natural Heritage
OL	Open Lab
PDRP	Pre-Disaster Recovery Plan/Planning
PDRR	Pre-Disaster Recovery Roadmap
PRT	Planning Resilience Team
SP	Spatial Planning
WHL	UNESCO World Heritage List
WP	Work Package

1 Applying the SHELTER Pre-Disaster Recovery Roadmap methodology to the five Open Labs

The SHELTER Pre-Disaster Recovery Roadmap (PDRR) methodology is tested and applied to each OLs. Five tailored early recovery Roadmaps have been drafted, taking into account: i) the activities the case studies have already performed prior to or regardless of SHELTER project. The inputs that OLs provided to other Tasks (e.g., the policy instruments already in place mapped in Task 4.2) during the project implementation were used; ii) the outputs and outcomes generated so far from the project.

The main purpose of this activity has been to understand which steps of the Roadmap have been already completed and what else should be done by OLs to build their own early recovery Roadmap. To achieve that, the following process has been applied:

- UNIBO drafted the five tailored Roadmaps based on the information gathered from the outputs and outcomes generated so far from the project and the inputs that OLs provided to other Tasks. Miro¹ has been used as a collaborative tool to show the Roadmap and to collect feedback from OLs.
- bilateral remote meetings have been scheduled in early May 2022 with each OL, involving OL coordinators and OL technical partners. During these meetings, the colleagues involved were asked to provide their feedback and comments on the PDRR, to check the activities foreseen by the Roadmap, the checklist and the five phases in detail. Each OL coordinator and OL technical partner were also asked to double-check if they agreed on the inputs coming from SHELTER Tasks and to inform about other possible inputs not considered yet, to better understand which activities have been completed by the OL and which are still to be implemented;
- UNIBO finalized the changes and comments provided by OLs.

1.1 Ravenna Open Lab

The Italian case study of the SHELTER project is the complex of Santa Croce, located in the historic centre of Ravenna, in Emilia-Romagna Region. The complex is next to two (i.e. Basilica of San Vitale and Mausoleum of Galla Placidia) of the eight early Christian monuments of the city inscribed in the UNESCO World Heritage List (WHL). Due to this close proximity, the area of Santa Croce is included in the buffer zone of the Monumental Area of San Vitale, as defined by UNESCO for all the sites inscribed in the WHL. In this territory, subsidence and flooding have been identified as the two main hazards, together with structural instability, while climate change is considered as the amplifying phenomenon of these existing hazards.

¹ Miro | Online Whiteboard for Visual Collaboration, available at: <https://miro.com/>

1.1.1 PHASE 1 – GETTING STARTED: Form a Collaborative Planning Resilience Team

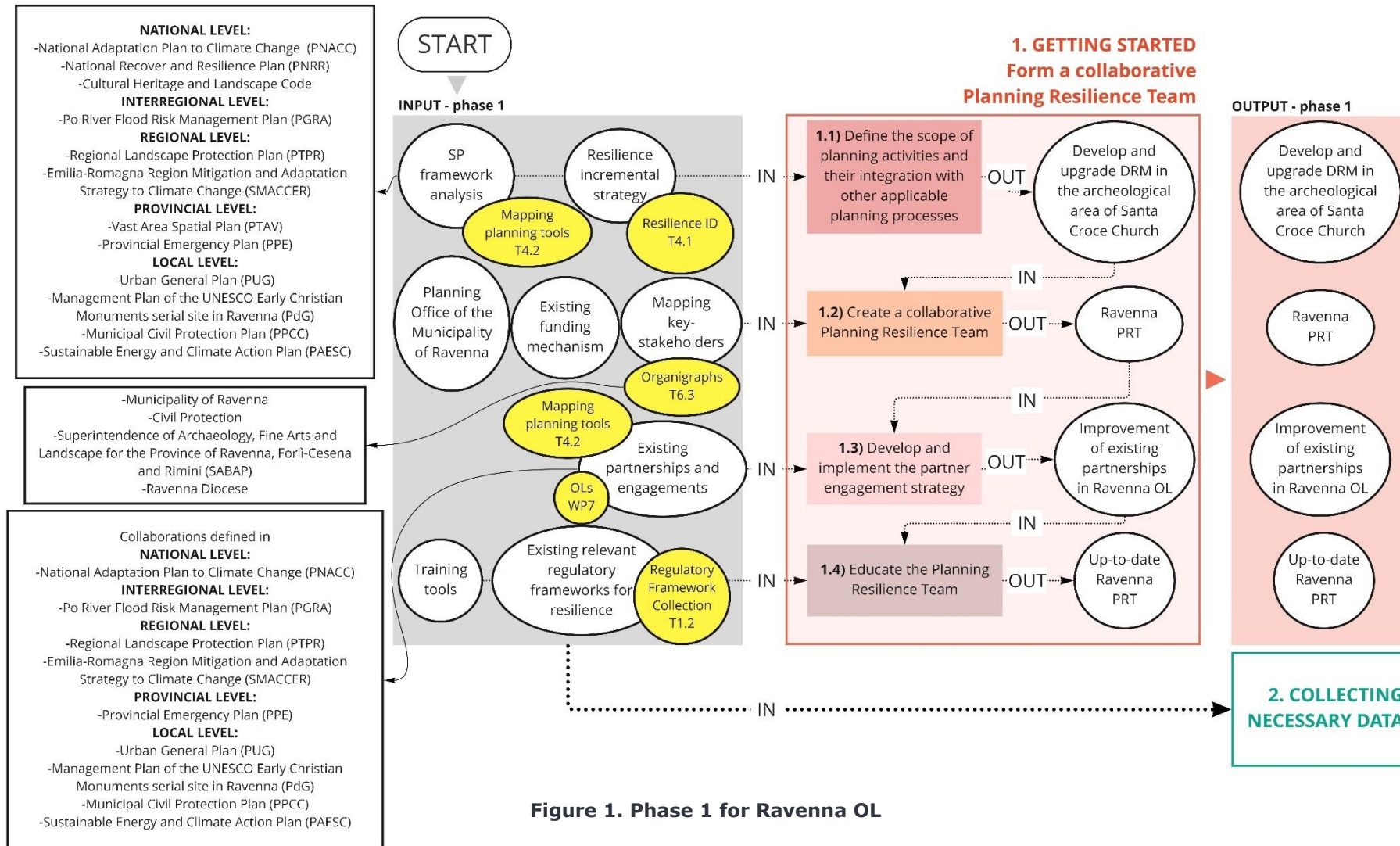


Figure 1. Phase 1 for Ravenna OL

Activity 1.1 - Define the scope of planning activities and their integration with other applicable planning processes (Figure 22)



Figure 2. Key-activity 1.1 for Ravenna OL

In order to better delineate the general scope of the PDRP activities, existing recovery, mitigation and adaptation plans and strategies have to be considered.

The planning tools, already collected in Task 4.2 *Definition of protocols, plans and guidelines for CCA/DRM and integration within planning policies*, that can be relevant in this step are the followings (Table 2).

LEVEL	SP TOOL
National level	National Adaptation Plan to Climate Change (PNACC)
	National Recover and Resilience Plan (PNRR)
	Cultural Heritage and Landscape Code
Interregional level	Po River Flood Risk Management Plan (PGRA-Po)
Regional level	Regional Landscape Protection Plan (PTPR)
	Emilia-Romagna Region Mitigation and Adaptation Strategy to Climate Change (SMACCER)
Provincial level	Vast Area Spatial Plan (PTAV)
	Provincial Emergency Plan (PPE)
Local level	Urban General Plan (PUG)
	Management Plan of The UNESCO Early Christian Monuments Serial Site in Ravenna (PdG)
	Municipal Civil Protection Plan (PPCC)
	Sustainable Energy and Climate Action Plan (PAESC)

Table 1. Relevant SP tools for Ravenna OL for Activity 1.1

From the analysis of the SP framework, it can be defined that the scope of the PDR planning for Ravenna OL is to develop and upgrade the DRM in the archaeological area of Santa Croce Church, especially against subsidence and flooding.

Activity 1.2 - Create a collaborative Planning Resilience Team (Figure 23)

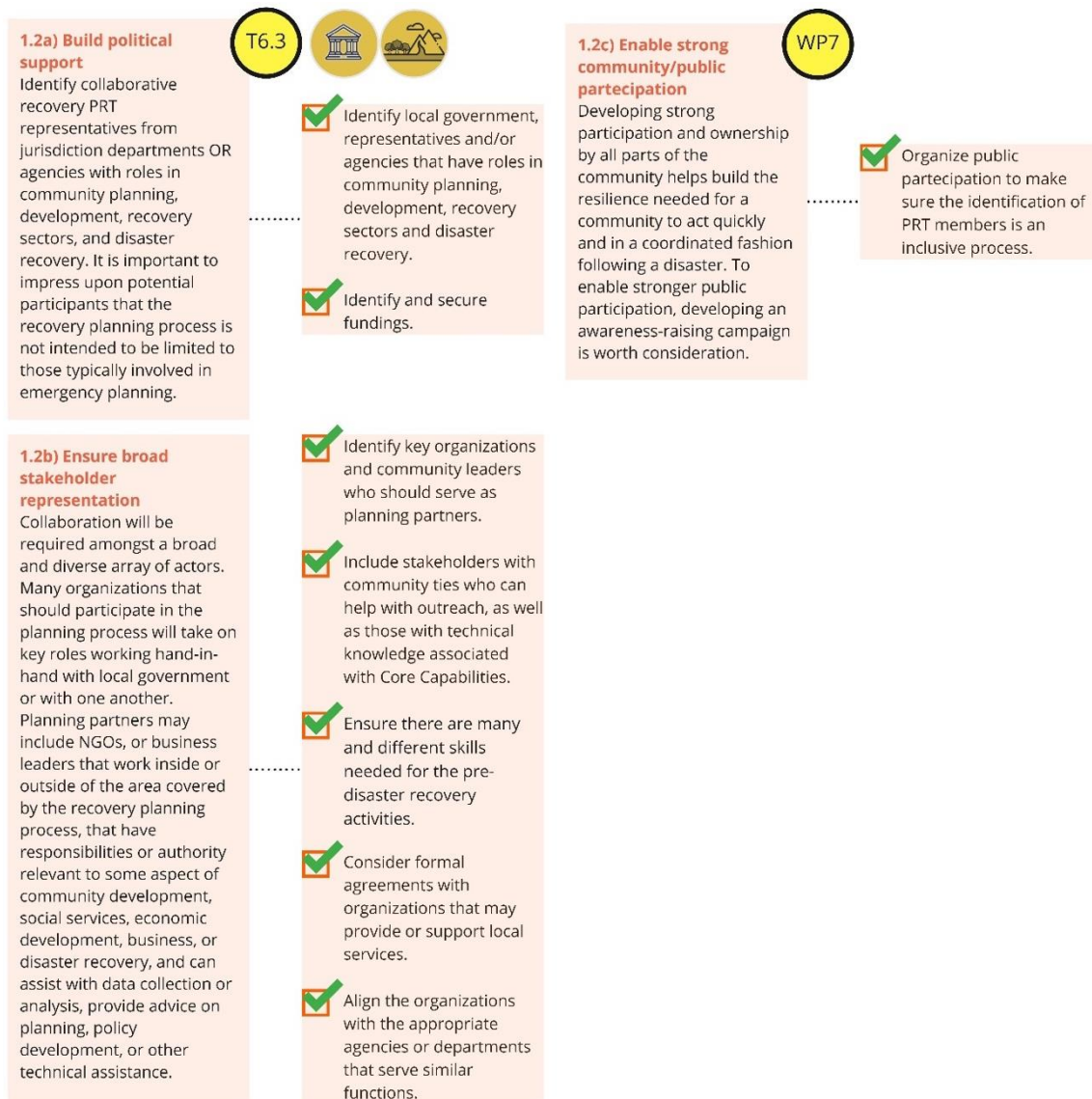


Figure 3. Key-activity 1.2 for Ravenna OL

According to the PDRR, the PRT should be formed by individuals with various skills and representatives of the whole community.

The Planning Office of the Municipality of Ravenna can be considered as the starting point to form the team which leads the recovery planning process. Article no. 55 of Emilia-Romagna Regional Law no. 24, dated 21 December 2017, establishes that the team must be equipped with professional skills, such as those in the planning, landscaped, environmental, legal and economic fields, in order to carry out tasks about urban planning, starting with the elaboration of the PUG.

According to the Organigraph, developed in Task 6.3, there are several political and technical entities that offer their contribution to the process:

- Civil Protection, responsible for emergency and DRM
- Superintendence of Archaeology, Fine Arts and Environment for the Province of Ravenna, Forlì-Cesena and Rimini, which deals with cultural heritage protection
- Ravenna Diocese, which has the property of the archaeological site

Activity 1.3 – Develop and implement the partner engagement strategy (Figure 24)

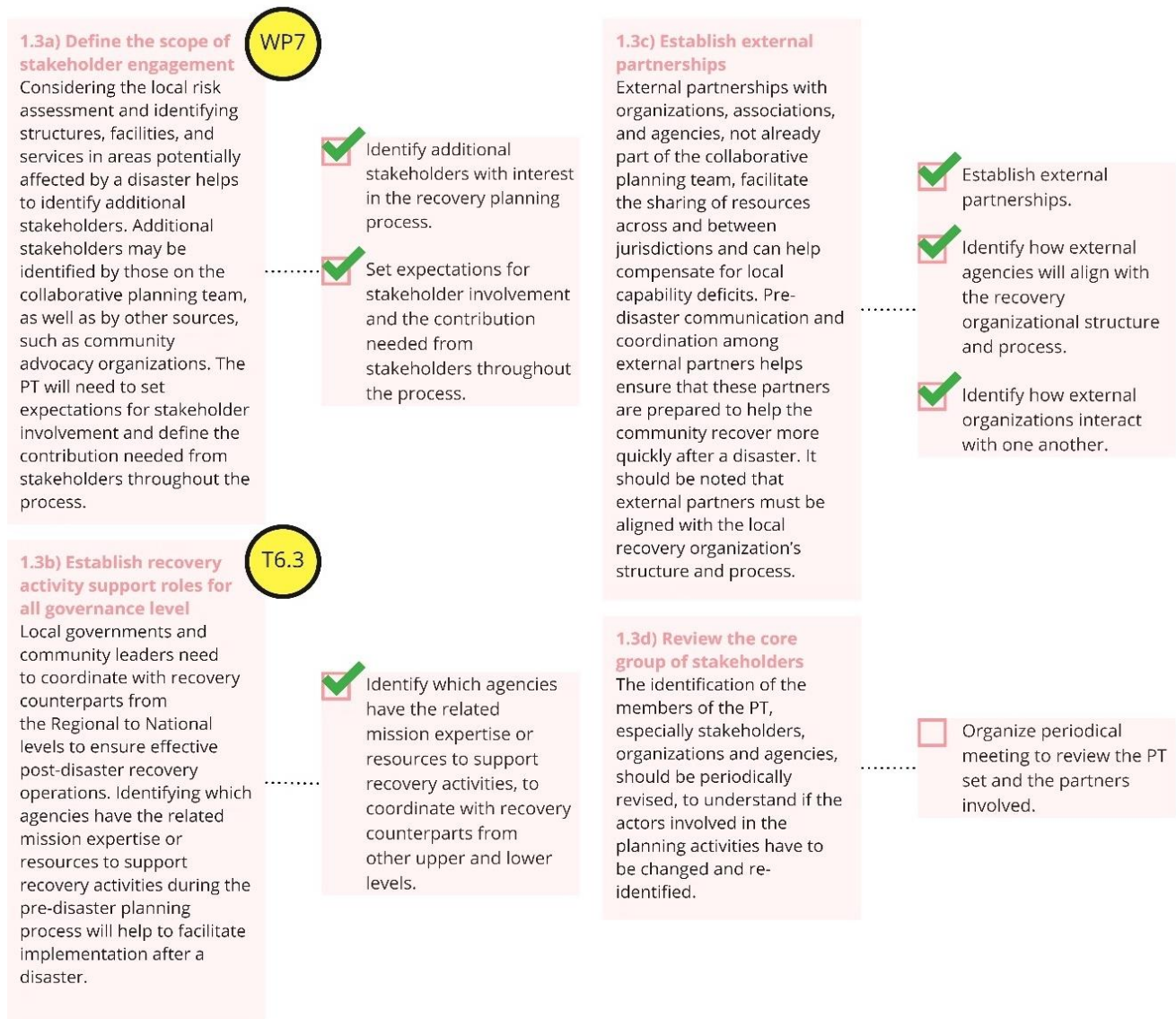


Figure 4. Key-activity 1.3 for Ravenna OL

To evaluate continually additional stakeholders and new partners to be included as needed throughout the planning process, it is possible to consider the collaborations defined in the following planning tools (Table 3).

LEVEL	SP TOOL
National level	National Adaptation Plan to Climate Change (PNACC)
Interregional level	Po River Flood Risk Management Plan (PGRA-Po)
Regional level	Regional Landscape Protection Plan (PTPR)
	Emilia-Romagna Region Mitigation and Adaptation Strategy to Climate Change (SMACCER)
Provincial level	Provincial Emergency Plan (PPE)
Local level	Urban General Plan (PUG)
	Management Plan of The UNESCO Early Christian Monuments Serial Site in Ravenna (PdG)
	Municipal Civil Protection Plan (PPCC)
	Sustainable Energy and Climate Action Plan (PAESC)

Table 2. Relevant SP tools for Ravenna OL for Activity 1.3

A list of entities involved in previous DRM projects is the one reported in the Municipal Civil Protection Plan (*PPCC*):

- Law enforcement (Police, Carabinieri)
- Fire department
- Volunteers
- Surrounding Municipalities
- Emergency services

Other important partnerships are defined with:

- Regional Agency for Prevention, Environment and Energy of Emilia-Romagna (ARPAE)
- Emilia Romagna Valorizzazione Economica e Territorio, Emilia Romagna Economic Development and Territory (ERVET)
- Research centres of the University of Bologna

Activity 1.4 – Educate the Planning Resilience Team (Figure 25)

Within the Civil Protection organization, one of the most important operational sectors is voluntary work. Over the years, the volunteers have become an organized, trained and prepared reality, representing all the professions and knowledge of the society.

To increase preparedness and maximize understanding, the Municipality of Ravenna with Civil Protection and the citizens should undertake regular activities such as a schedule of training and exercises.

The activities in Civil Protection are divided into exercises and rescue tests. The first ones verify emergency plans or test organizational models relying on simulation of a real emergency, instead, the rescue tests verify system intervention capability in research and rescue. These operations aids the community and the PRT in understanding its role in recovery preparedness and plan implementation.

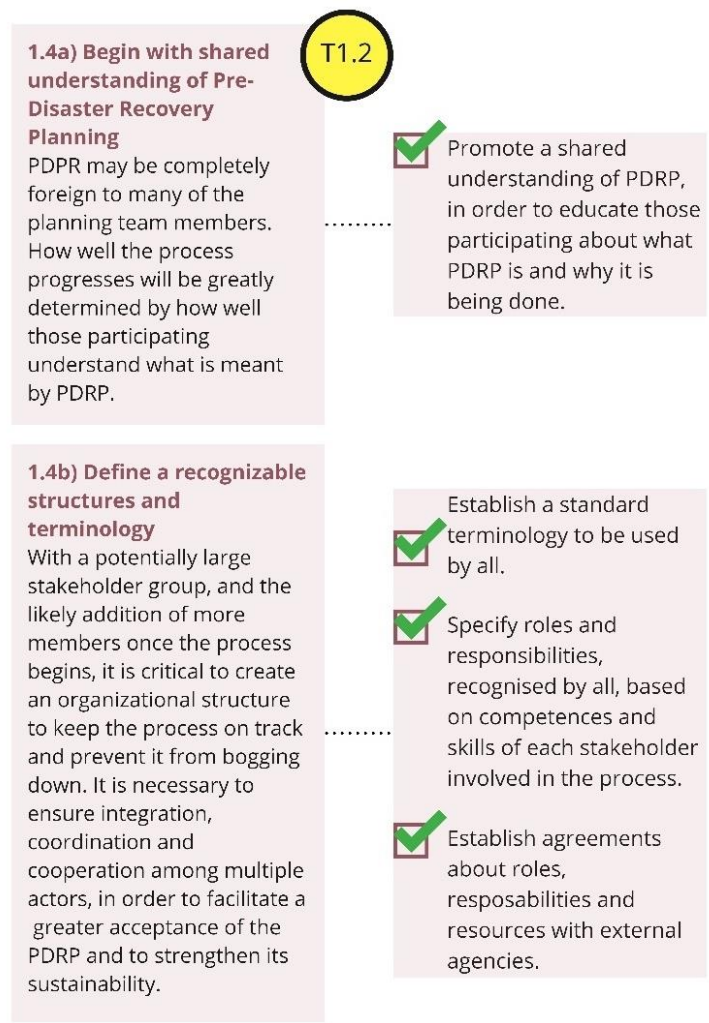


Figure 5. Key-activity 1.4 for Ravenna OL

Regarding the first phase, it is possible to say that Ravenna OL has a well-defined team, in terms of planning resilience: it has a clear structure, a large range of actors with different skills and all roles and responsibilities are very well determined.

The local communities are involved in this planning process by the administration, especially using the website of the municipality and social media websites.

1.1.2 PHASE 2 – COLLECTING NECESSARY DATA: Understand the situation

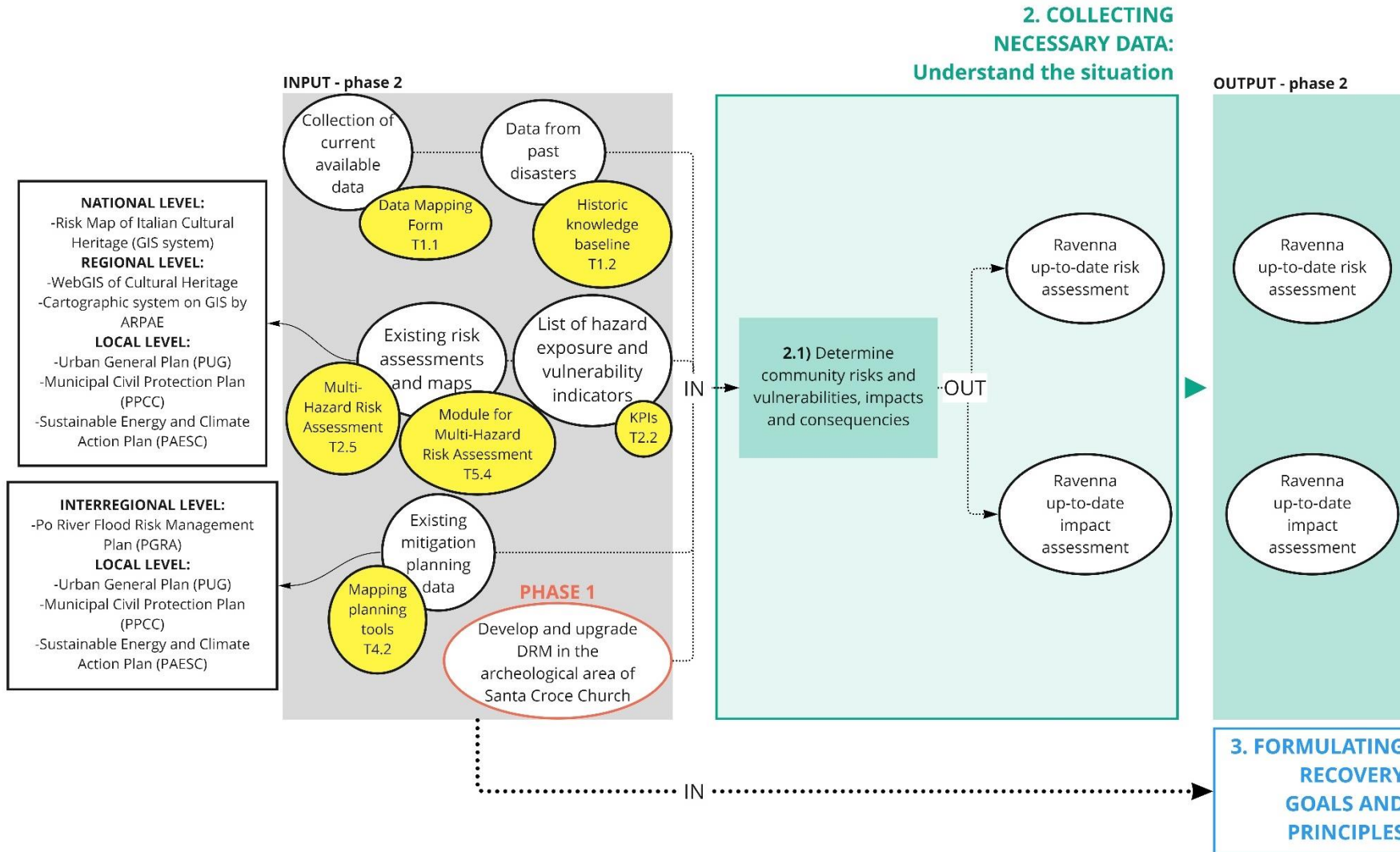


Figure 6. Phase 2 for Ravenna OL

Activity 2.1 - Determine community risks and vulnerabilities, impacts and consequences (Figure 27)

The Ravenna OL can use many different instruments to obtain specific disaster risk information.

From SHELTER, the available inputs are:

- Data Mapping Form, which collects all currently available data
- Historic knowledge baseline, to be informed about past events’ impacts
- Multi-Hazard Risk Assessment
- Set of KPIs, as hazard exposure and vulnerability indicators

Furthermore, there are several planning tools that provide specific disaster risk information (Table 4).

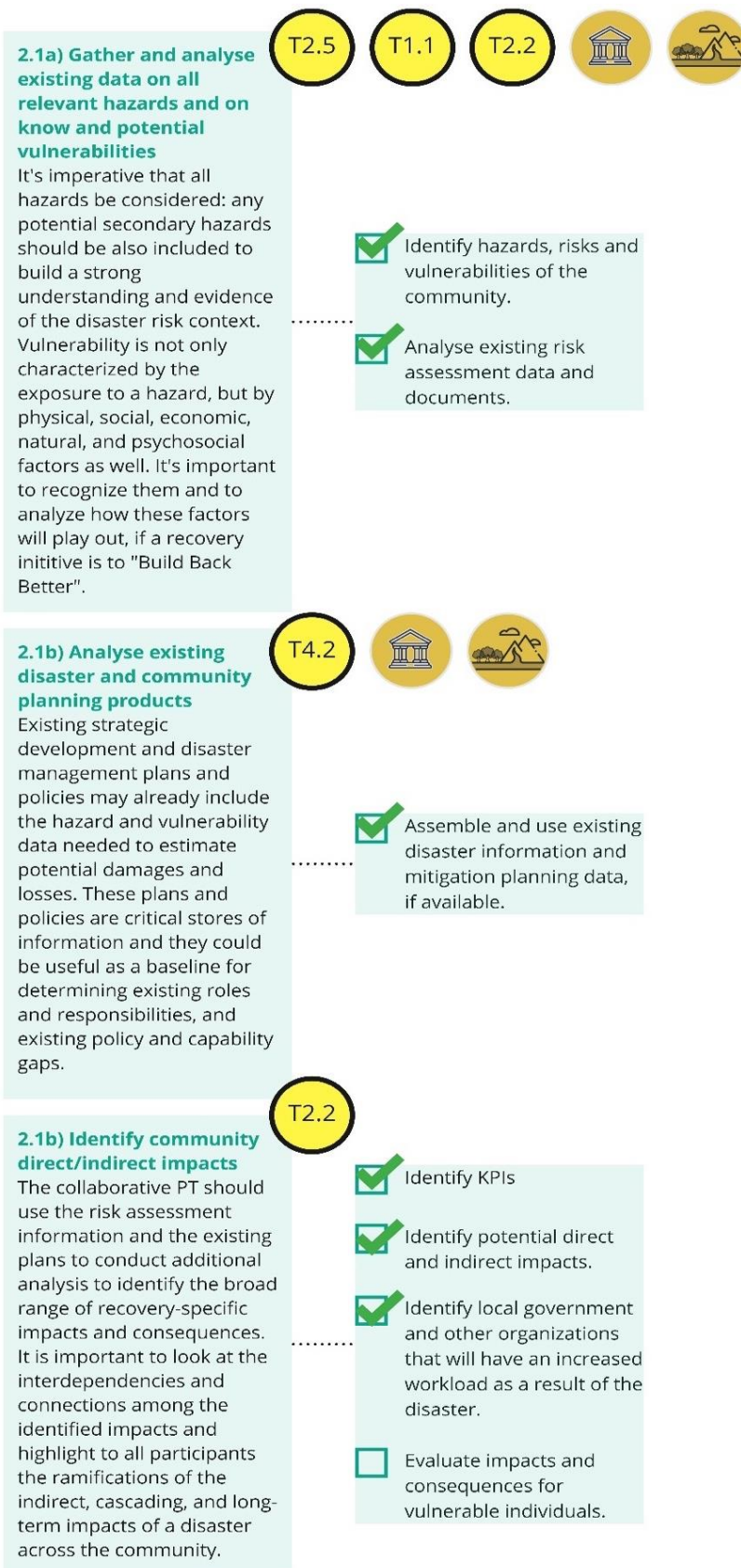
LEVEL	SP TOOL
National level	Risk Map of Italian Cultural Heritage (GIS system)
Interregional level	Po River Flood Risk Management Plan (PGR-A-Po)
Local level	Urban General Plan (PUG)
	Municipal Civil Protection Plan (PPCC)
	Sustainable Energy and Climate Action Plan (PAESC)

Table 3. Relevant SP tools for Ravenna OL for Activity 2.1

First of all, the *Municipal Civil Protection Plan (PPCC)* evaluates all the possible risks that can affect Ravenna, providing risk maps and analysis of the most vulnerable elements of the territory and the community. For each risk, the plan identifies potential direct and indirect impacts on the Ravenna community and systems and it develops events and risk scenarios to identify community consequences.

The *General Urban Plan (PUG)* contains the latest risks and vulnerabilities assessment, accurately described in its Cognitive Framework. It asserts that the main risks which affect Ravenna territory are earthquakes, subsidence, flooding, significant variations in microclimate and pollution. These risks are amplified by climate change effects that are also causing the slow but gradual rising sea level, which is the most serious hazard with long term impact. For each risk, the *Environmental and Spatial Sustainability Assessment (VALSAT)* reports schemes which delineate direct and indirect effects on Ravenna’s territory.

Another planning tool which provides information about territory risks is the *Sustainable Energy and Climate Action Plan (PAESC)*. It includes detailed research, edited gathering and analyzing existing cartography in 2020, that identifies the main risks and environmental vulnerabilities of Ravenna territory.



At interregional level, the *Flood Risk Management Plan (PGRA)* provides a flood risk assessment, building risk scenarios described through maps which constitute the cognitive framework. Monitoring and forecasting programmes are also defined to assess flood risk evolution.

At the national there is also the *Risk Map of Italian Cultural Heritage* is a helpful GIS system to consult, in order to obtain information and data regarding the risks that affected the Italian CH. At regional level, it is possible to consult the *Cartographic system on GIS* by ARPAE, that contains maps, data and documents regarding environmental issues presented in the territory, and the *WebGIS of Cultural Heritage*, which collects all the regional cultural assets.

Regarding the second phase, it is possible to say that Ravenna OL has many available data, to gather information about hazards, risks and vulnerabilities to face in its territory. The CH is very well taken into account: in fact, both at national and regional level there are GIS systems to gather information about cultural assets and their risks and vulnerabilities.

Figure 7. Key-activity 2.1 for Ravenna OL

1.1.3 PHASE 3 – FORMULATING RECOVERY GOALS AND PRINCIPLES

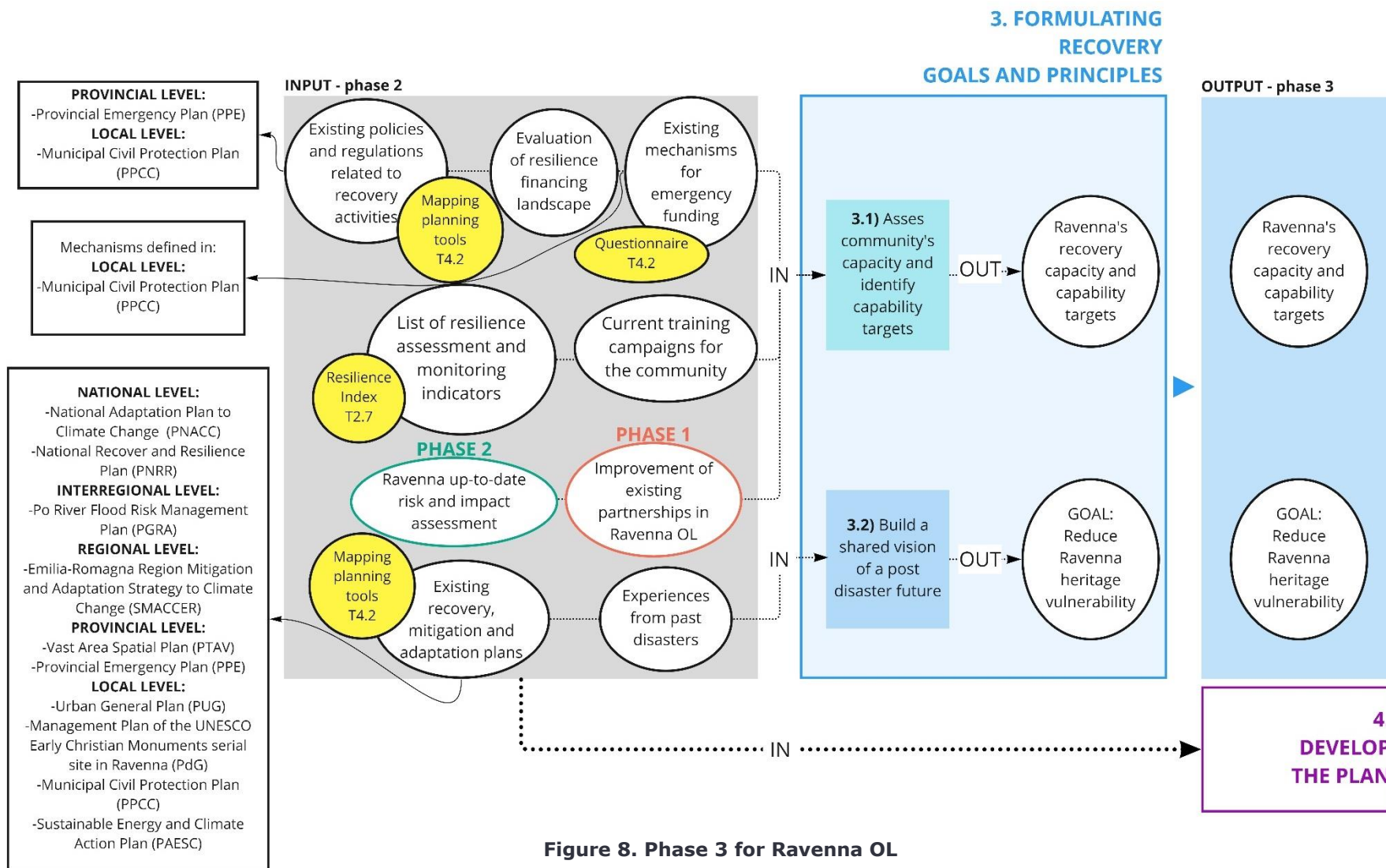


Figure 8. Phase 3 for Ravenna OL

Activity 3.1 – Assess community’s capacity and identify capability targets (Figure 29)

Based on the risk assessment of the previous phase, this activity is to evaluate the strengths and weaknesses of existing DRM operations and organizations.

First of all, it is possible to take relevant information from some planning tools collected in Task 4.2, related to recovery activities. The most important SP tools identified are the followings (Table 5).

LEVEL	SP TOOL
Provincial level	Provincial Emergency Plan (PPE)
Local level	Municipal Civil Protection Plan (PPCC)

Table 4. Relevant SP tools for Ravenna OL for Activity 3.1

The PPE defines the chain of command and the coordination procedures, identifies the human resources and materials necessary to face and overcome the emergency situation. It entrusts each entity involved, such as administrations, technical structures but also groups of volunteers, with responsibility for specific intervention activities in the emergency situation.

The PPCC aims to provide a specific strategy to deal with an emergency situation at Municipal level, defining activities to avoid or minimize the possibility of damage resulting from the natural and anthropogenic risks as well as measures aimed at overcoming the emergency condition. In addition to the strategic document, there are specific operational plans to deal with different emergency situations triggered by different risks. They consist of guidelines and regulations describing the operations to be implemented in case of specific events. The contents are intervention procedures, communication guidelines, activation of logistic and technical reference authorities, administrative, financial and reconstruction procedures.

From SHELTER, the available input is:

- Resilience Index, which provides a list of resilience assessment and monitoring indicators

In this step, it is relevant to take into account all the previous assessments, regarding threats, risks and impacts that the community should address. Also, the partner engagement strategy, developed in phase 1, is helpful to evaluate staffing resources, in terms of quantity and expertise, and the financial resources available, identifying potential community needs and gaps. The activities of exercise and rescue test, promoted by the Civil Protection, are helpful to identify gaps in policies, partners, resources and procedures.

In the Municipality of Ravenna, much attention is paid to promote a sustainable culture and encourage CH protection. From this point of view, an important local agency is the Environmental Sustainability multi-centre of Ravenna. It realizes integrated projects for

sustainable development of the territory, collaborating with Civil Protection in order to increase public understanding and awareness of the disaster risks through training projects, simulation exercises, educational lessons in schools, etc.

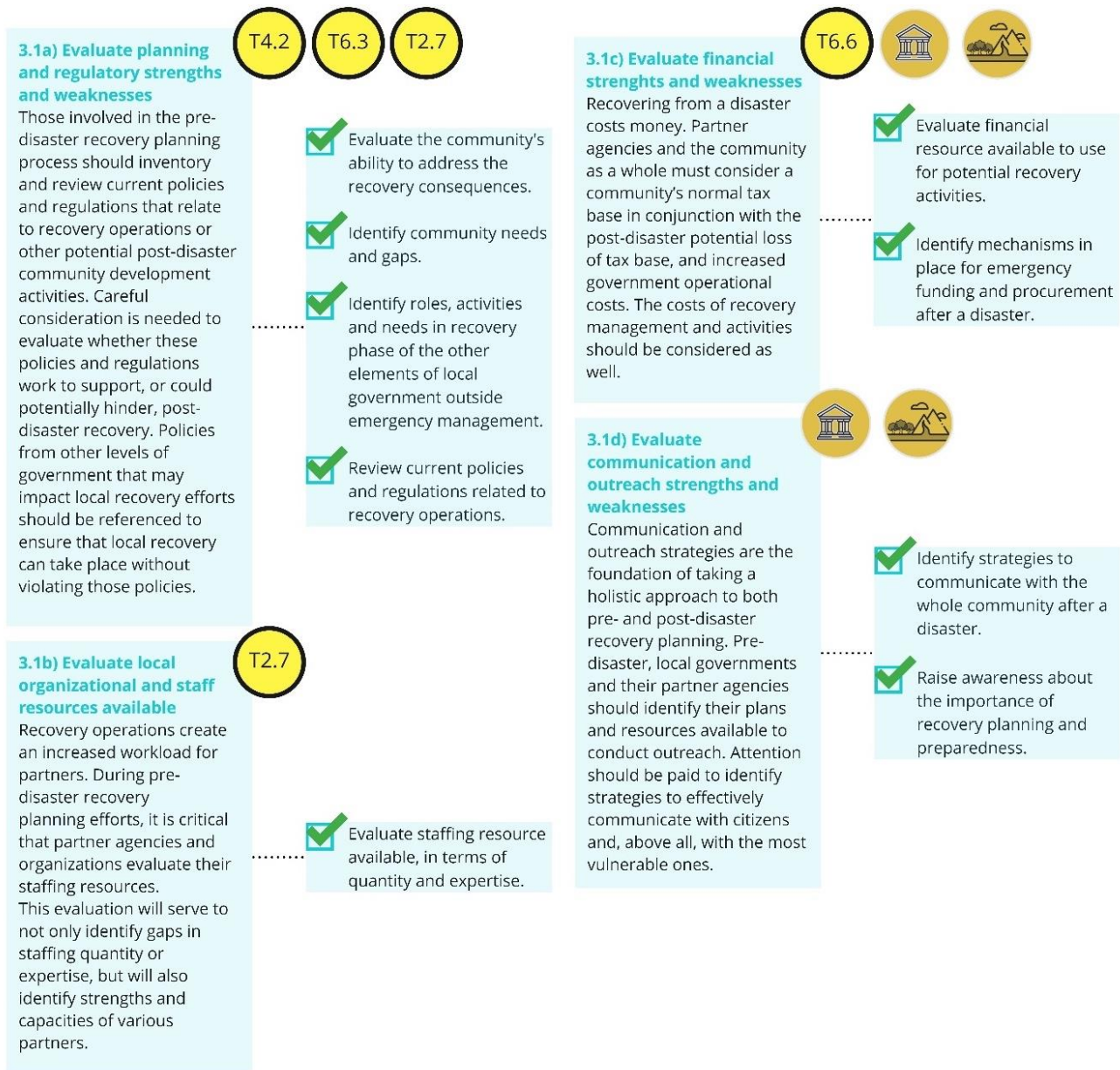


Figure 9. Key-activity 3.1 for Ravenna OL

Activity 3.2 – Build a shared vision of a post-disaster future (Figure 30)

The main potential recovery goal for Ravenna OL could be to reduce Ravenna’s cultural heritage vulnerability. This goal coincides with the overall aims and the objectives of the following planning tools (Table 6).

LEVEL	SP TOOL
National level	National Adaptation Plan to Climate Change (PNACC)

	National Recover and Resilience Plan (PNRR)
Interregional level	Po River Flood Risk Management Plan (PGRA)
Regional level	Emilia-Romagna Region Mitigation and Adaptation Strategy to Climate Change (SMACCR)
Provincial level	Vast Area Spatial Plan (PTAV)
	Provincial Emergency Plan (PPE)
Local level	Urban General Plan (PUG)
	Management Plan of The UNESCO Early Christian Monuments Serial Site in Ravenna (PdG)
	Municipal Civil Protection Plan (PPCC)
	Sustainable Energy and Climate Action Plan (PAESC)

Table 5. Relevant SP tools for Ravenna OL for Activity 3.2

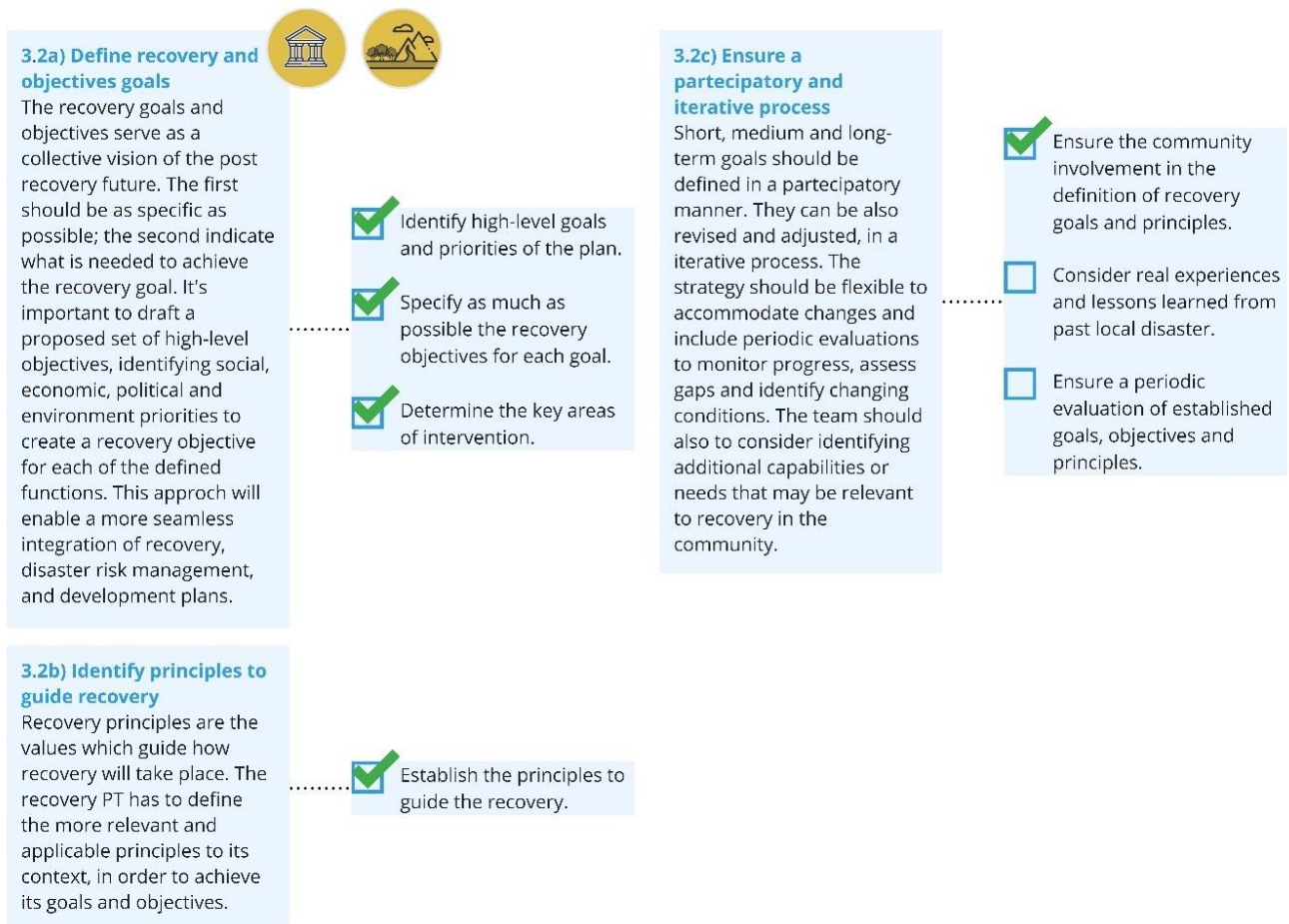


Figure 10. Key-activity 3.2 for Ravenna OL

Regarding the third phase, it is possible to say that in Ravenna OL the identification of community needs and gaps is very well-covered, and the recovery goals and objectives are well defined, both at local level and upper levels.

1.1.4 PHASE 4 – DEVELOP THE PLAN: Establish post-disaster recovery organisation and outline recovery-specific decisions

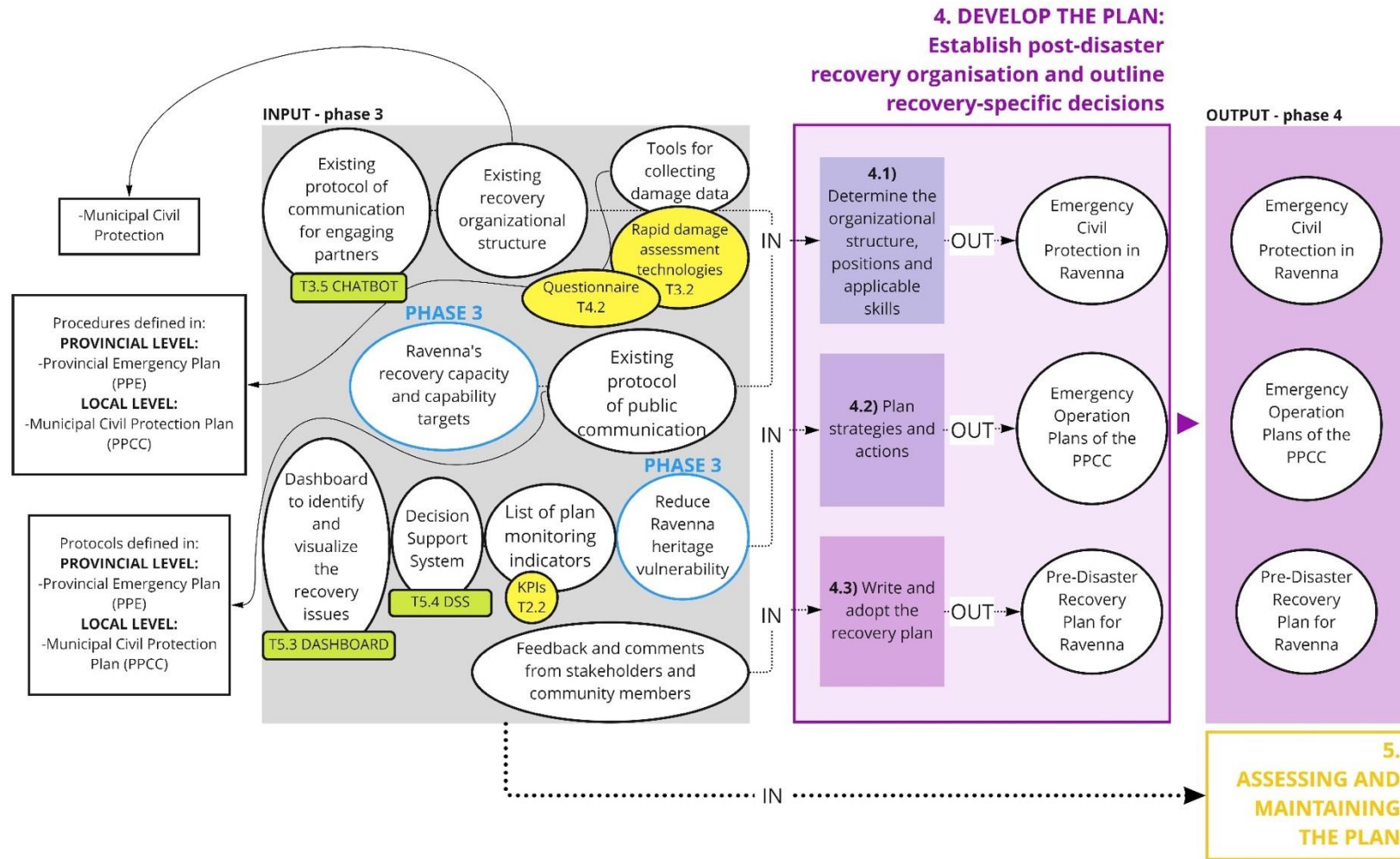


Figure 11. Phase 4 for Ravenna OL

Activity 4.1 – Determine the organizational structure, positions and applicable skills (Figure 32)

Those involved in the planning process should start by evaluating the existing recovery organization.

The Municipal Civil Protection Plan defines recovery organization, roles and resources related to precise functions and tasks. It specifies authorities involved, functions, responsibilities, roles, organisation model, necessary operations, materials, instruments and spaces. In case of an event the Civil Protection system is able to scale-up operations to a level appropriate to the event in question, as it integrates human resources and equipment from different organisations into coherent and concerted emergency management operations. The Civil Protection quickly and accurately evaluates the severity of events, thanks to strong situation awareness and collaborations with the scientific community, in order to involve the right entities, such as the Municipality in case of ordinary emergency or State Organs in case of extraordinary disasters.

The command-and-control system of the Municipal Civil Protection consists of the Mayor, that takes command of rescue services in case of emergency, the Municipal Civil Protection Committee, which deals with activities coordination, the Municipal Civil Protection Operations Center, that assists the Mayor in rescue services' management and coordination, and the Municipal Civil Protection Service, that coordinates forecasting, prevention, relief and restoring normality activities. Each agency has specific functions and responsibilities for both time of emergency and period without disasters.

From SHELTER, the available input is:

- Chatbot, that can be used as a protocol of communication for notifying and engaging recovery partners.

As mentioned above, the main recovery planning tools, *Municipal Civil Protection Plan (PPCC)* and the *Provincial Emergency Plan (PPE)* contain useful information regarding procedures to apply when a disaster happens: responsibilities and tasks for people involved in the emergency and recovery phases, protocols of communication, procedures and mechanism to collect damage data and to share them among partners, as well as procedures for public communication.



Figure 12. Key-activity 4.1 for Ravenna OL

Activity 4.2 – Plan strategies and actions (Figure 33)

Considering the contents of the existing recovery, mitigation and adaptation plans, it is possible to assert that in Ravenna OL strategies and actions to address recovery issues, both before and after a disaster, are already defined.

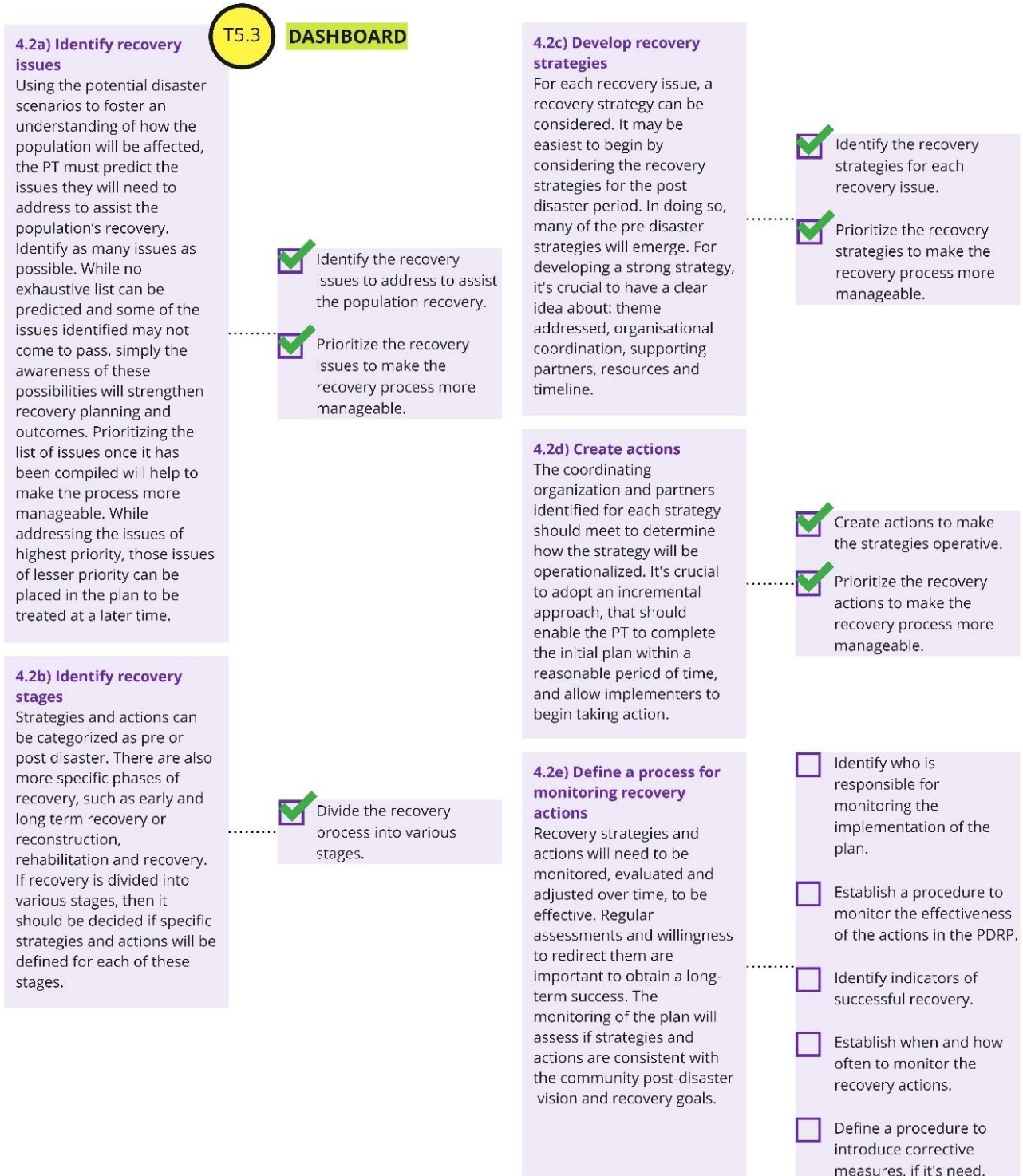


Figure 13. Key-activity 4.2 for Ravenna OL

Activity 4.3 – Write and adopt the recovery plan (Figure 34)

If the community needs to develop a new PDRP, all information, documents and decisions made in the previous phases have to be gathered to form a new written plan.

When the plan is adopted, the whole community is invited to review and provide feedback before the final approval of the document. After an appropriate period of time to allow feedback, planners need to hold hearings to assess all observations from the community and modify the PDRP, if necessary. Once the plan has been corrected, there is the final approval phase of the planning process and the consequent release.

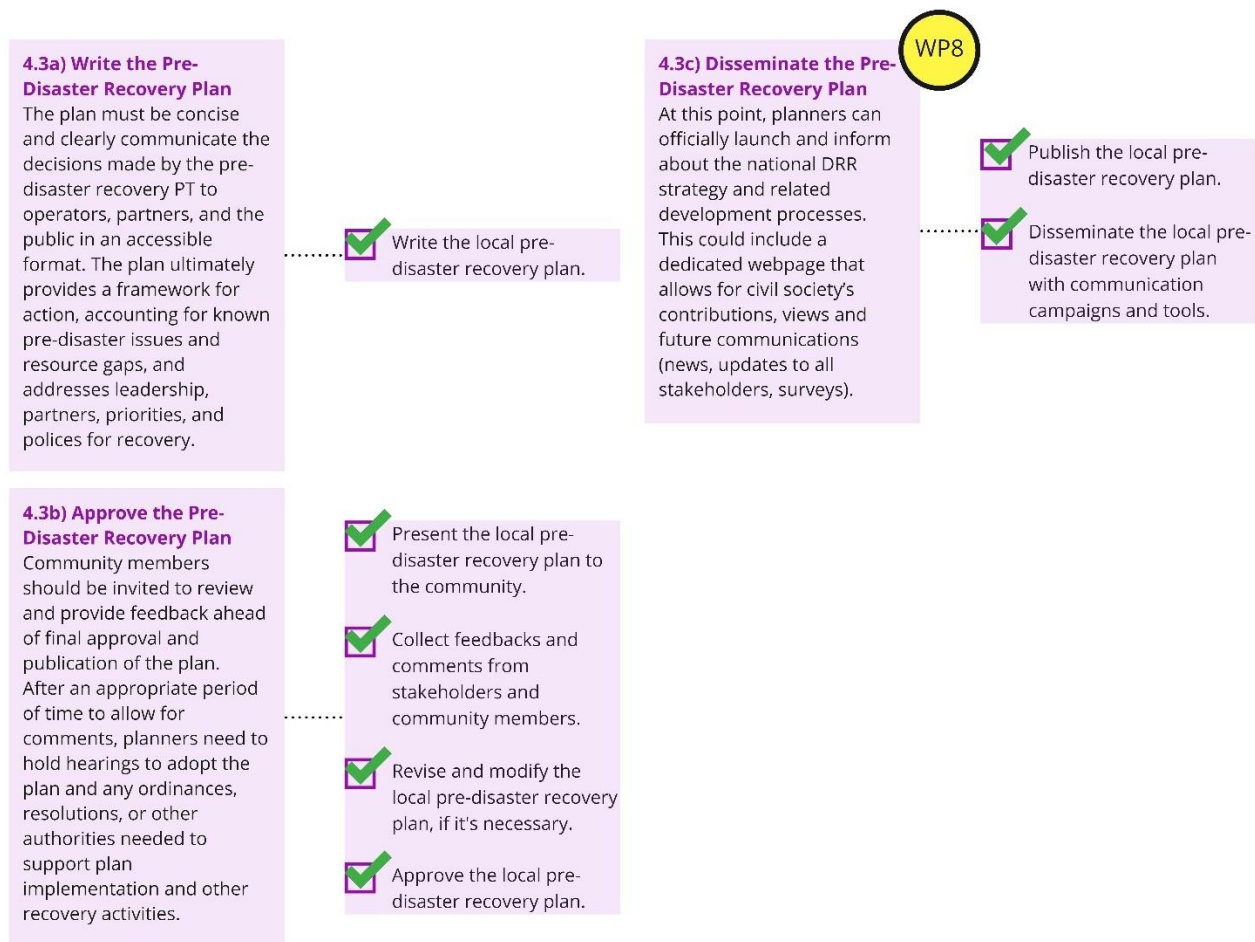


Figure 14. Key-activity 4.3 for Ravenna OL

Regarding the fourth phase, it is possible to say that Ravenna OL is provided with an effective post-disaster operational process described in the Emergency Operation Plans of the *Municipal Civil Protection Plan (PPCC)*. The OL does not have the need to write and approve a new planning tool.

1.1.5 PHASE 5 –ASSESSING AND MAINTAINING THE PLAN: review and update

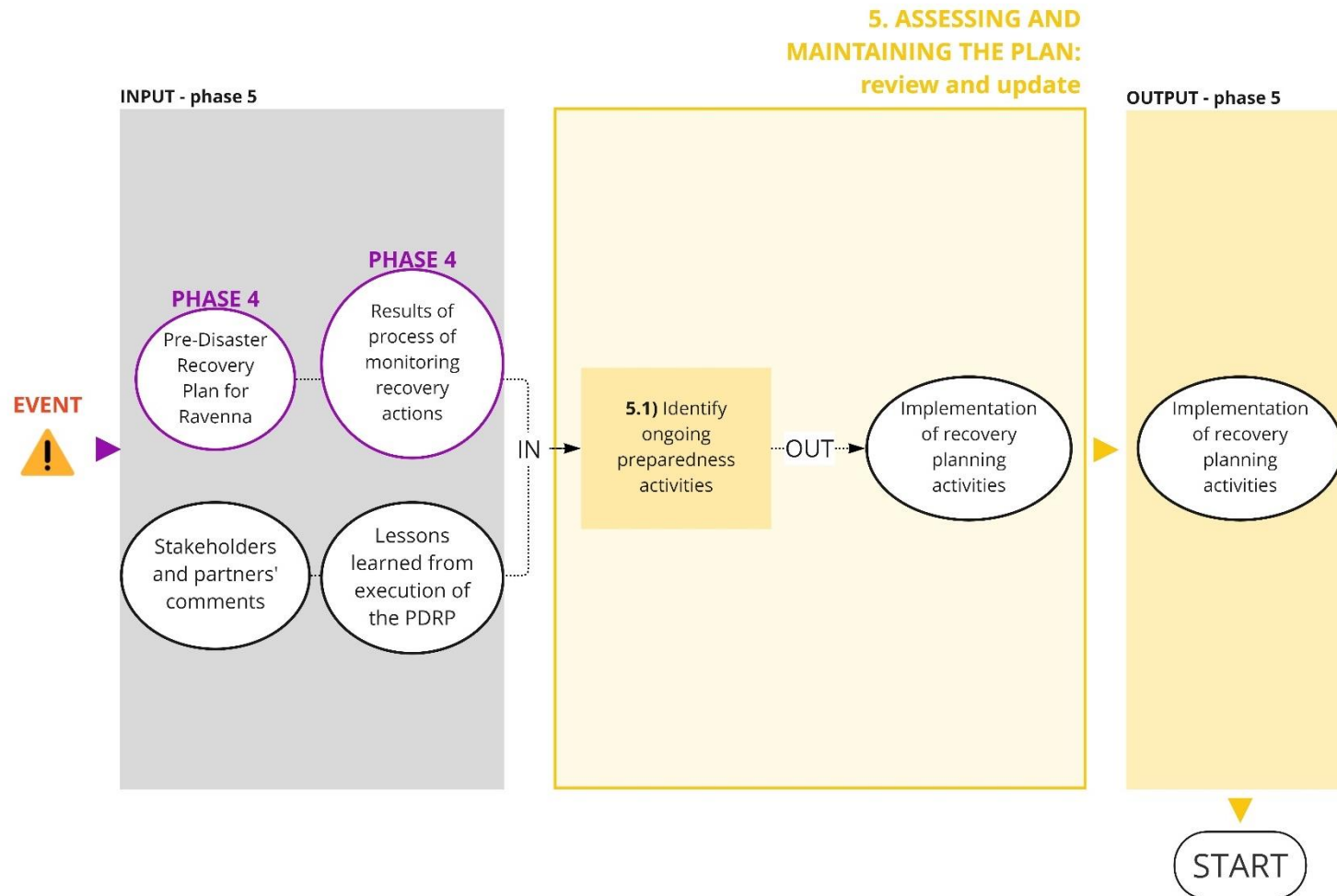


Figure 15. Phase 5 for Ravenna OL

Activity 5.1 – Identify ongoing preparedness activities (Figure 36)

Phase 5 is made to encourage planners to identify training and exercise opportunities, and to establish a schedule for revision and review of plans. Reviews and revisions of PDRPs are based on real-world events, such as subsidence phenomena or earthquakes, exercise experiences or lessons learned by other jurisdictions.

Ongoing activities ensure that recovery stakeholders are able to effectively manage post-disaster recovery activities (FEMA, 2016).



Figure 16. Key-activity 5.1 for Ravenna OL

To increase preparedness and maximize understanding, the Municipality of Ravenna with Civil Protection and the citizens should undertake regular activities such as schedule of training and exercises: as mentioned above, the Civil Protection organizes exercises and rescue tests.

Another important ongoing preparedness activity is the regular evaluation and review of the PDRP, policy documents and ordinances, since the capabilities, threats, hazards, and vulnerabilities of the community may gradually change over time and a plan update can be necessary. Changes in the PDRP may also be done to comply with new government's regulations and laws. Furthermore, lessons learned from the execution of the plan in a post-disaster phase should be documented to guide future revisions of the plan.

Regarding the fifth phase, it is possible to say that the Municipality of Ravenna with Civil Protection and the citizens undertake regular activities such as schedule of training, exercises, and document reviews and updates.

1.1.6 Summary of the Early Recovery Roadmap for Ravenna OL

Figure 37 shows the progress of Ravenna OL for each phase of the PDRR, through a qualitative indicator in the form of a loading bar.

In addition, the summary list (Table 7) is helpful to identify which activities are already done and which not, to highlight the complete aspects and the pending ones in the process of PDRP for Ravenna OL.

To summarise, the application of the early recovery Roadmap to the Ravenna OL has shown that the majority of steps, activities and sub-activities have been already taken into account in national, regional, local policy and planning instruments, although the PDRP as such, as conceived by this methodology, has not been developed yet. Nevertheless, Ravenna OL is provided with an effective post-disaster operational process described in the Emergency Operation Plans of the *Municipal Civil Protection Plan*. A brand-new PDRP might not be relevant for Ravenna OL, as long as the existing plan will be revised to take into account the activities and sub-activities that this methodology proposed, and that have not been completed yet.

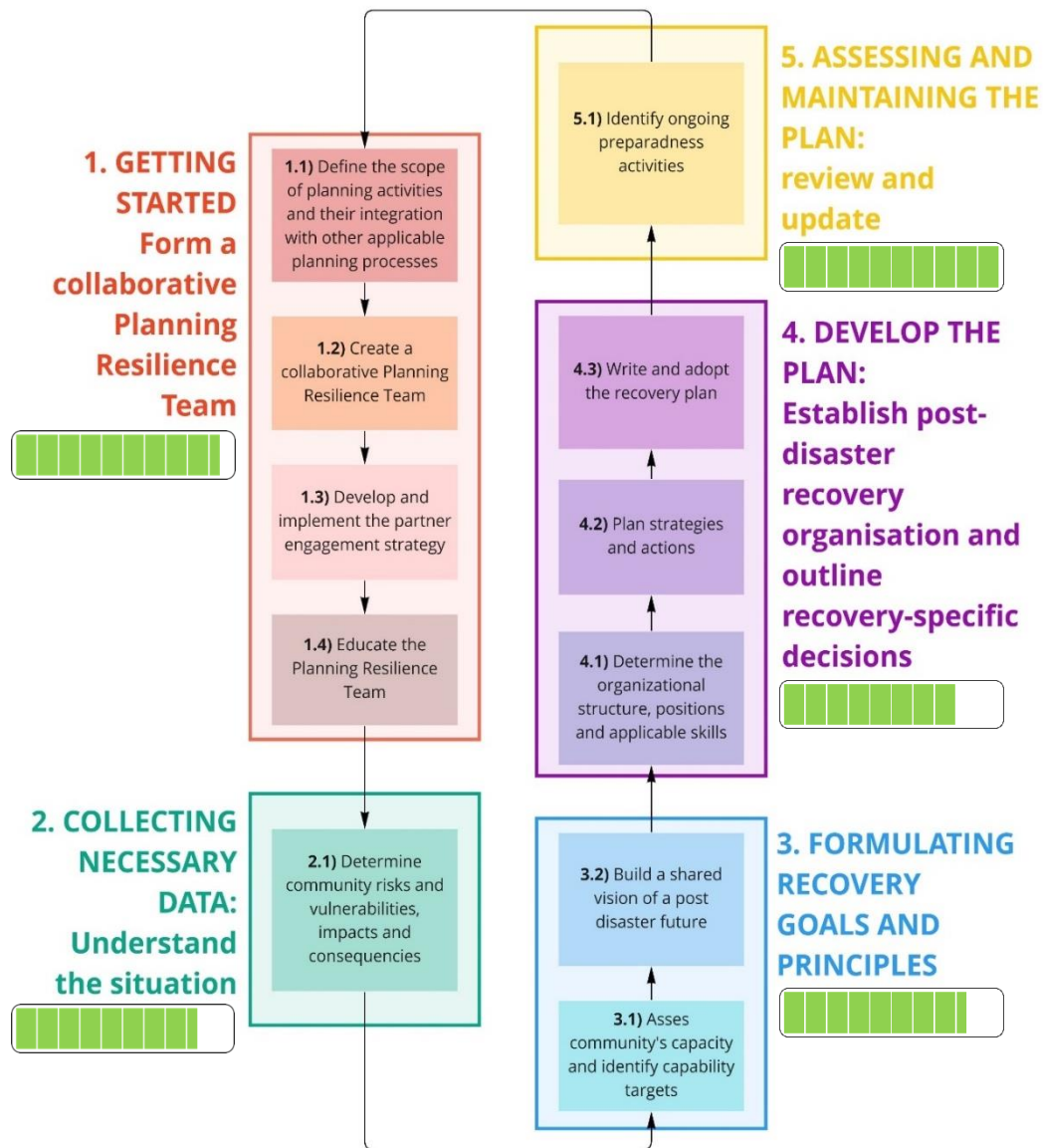


Figure 17. Progress in the PDRR for Ravenna OL

PHASE 1	
complete sub-activities	1.1a) Define the scope and timing of recovery planning activities 1.1b) Determine whether existing community planning documents can be leveraged or 1.2a) Build political support 1.2b) Ensure broad stakeholder representation 1.2c) Enable strong community/public participation 1.3a) Define the scope of stakeholder engagement 1.3b) Establish recovery activity support roles for all governance level 1.3c) Establish external partnerships 1.4a) Begin with shared understanding of Pre-Disaster Recovery Planning 1.4b) Define a recognizable structures and terminology
pending sub-activity	1.3d) Review the core group of stakeholders
PHASE 2	
complete sub-activities	2.1a) Gather and analyse existing data on all relevant hazards and on know and potential vulnerabilities

	2.1b) Analyse existing disaster and community planning products 2.1b) Identify community direct/indirect impacts
pending aspect	Evaluate impacts and consequences for vulnerable individuals in sub-activity 2.1b
PHASE 3	
complete sub-activities	3.1a) Evaluate planning and regulatory strengths and weaknesses 3.1b) Evaluate local organizational and staff resources available 3.1c) Evaluate financial strengths and weaknesses 3.1d) Evaluate communication and outreach strengths and weaknesses 3.2a) Define recovery and objectives goals 3.2b) Identify principles to guide recovery 3.2c) Ensure a participatory and iterative process
pending aspect	Consider real experiences and lessons learned from past disaster and ensure a periodic evaluation of established goals, objectives and principles in sub-activity 3.2c
PHASE 4	
complete sub-activities	4.1a) Establish an organizational structure 4.1b) Ensure recovery resource identification, management and coordination 4.1c) Develop a process for notifying and engaging recovery partners in preparation for or immediately after a disaster 4.1d) Prepare a process for gathering damage information and assessing impacts to evaluate and support recovery activities through the long-term 4.1e) Develop guidelines for recovery-related public communications 4.2a) Identify recovery issues 4.2b) Identify recovery stages 4.2c) Develop recovery strategies 4.2d) Create actions 4.3a) Write the Pre-Disaster Recovery Plan 4.3b) Approve the Pre-Disaster Recovery Plan 4.3c) Disseminate the Pre-Disaster Recovery Plan
pending sub-activity	4.2e) Define a process for monitoring recovery actions
PHASE 5	
complete sub-activities	5.1a) Undertake regular activities to increase preparedness 5.1b) Evaluate new vulnerabilities 5.1c) Conduct regular reviews of the Pre-Disaster Recovery Plan 5.1d) Document best practices and lessons learned
pending sub-activity	-

Table 6. Completed/pending activities for Ravenna OL